EXHIBIT 3

US011195224B2

(12) **United States Patent**
Werbitt

(10) **Patent No.: US 11,195,224 B2**
(45) **Date of Patent: Dec. 7, 2021**

(54) **PATRON SERVICE SYSTEM AND METHOD**

(71) Applicant: **Julie M. Werbitt**, Broomfield, CO (US)

(72) Inventor: **Julie M. Werbitt**, Broomfield, CO (US)

(73) Assignee: **Tiare Technology, Inc.**, Blackwood, NJ (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

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(22) Filed: **Dec. 12, 2018**

(65) **Prior Publication Data**

US 2019/0122288 A1 Apr. 25, 2019

Related U.S. Application Data

(63) Continuation of application No. 15/820,195, filed on Nov. 21, 2017, now Pat. No. 10,157,414, which is a (Continued)

(51) **Int. Cl.**
G06Q 10/06 (2012.01)
G06Q 30/06 (2012.01)
(Continued)

(52) **U.S. Cl.**
CPC ***G06Q 30/0633*** (2013.01); ***G06Q 20/20*** (2013.01); ***G06Q 30/02*** (2013.01);
(Continued)

(58) **Field of Classification Search**
CPC G06Q 30/00; G06Q 20/00; G06Q 10/00; G06Q 30/02; H04Q 7/22; G06F 1/16; G06F 1/1698
(Continued)

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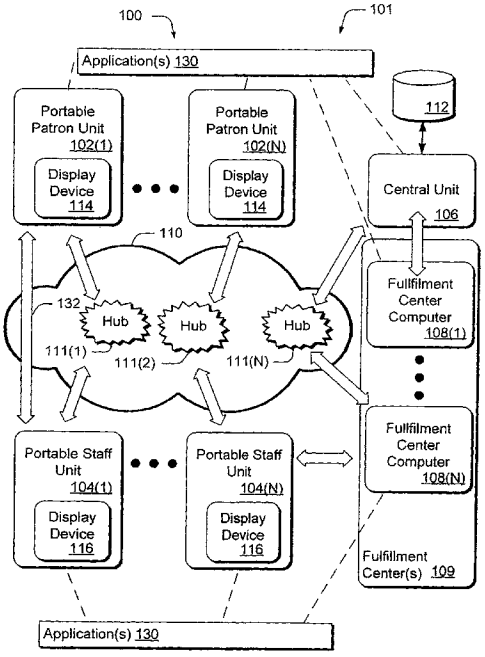
Primary Examiner — Olusegun Goyea
(74) *Attorney, Agent, or Firm* — Fish & Richardson P.C.

(57) **ABSTRACT**

A method provides for using a wireless patron unit within a venue and within a vicinity of the venue. The method includes providing at least one patron with a wireless patron unit by either permitting the at least one patron to temporarily use a provided wireless patron unit that includes at least one venue specific application program, or by providing at least one venue specific application program to the at least one patron for downloading into a patron-owned wireless communication device that can be used during the at least one patron's visit to the venue. The method also includes connecting the wireless patron unit to a server enabling communication between the wireless patron unit and the server, entering a patron order for at least one item or service provided by the venue into the wireless patron unit, and determining a current location of the wireless patron unit.

29 Claims, 13 Drawing Sheets



Related U.S. Application Data

continuation of application No. 14/317,347, filed on Jun. 27, 2014, now abandoned, which is a continuation of application No. 13/073,368, filed on Mar. 28, 2011, now Pat. No. 9,202,244, which is a continuation of application No. 10/665,525, filed on Sep. 19, 2003, now Pat. No. 7,945,477.

(60) Provisional application No. 60/412,863, filed on Sep. 23, 2002.

(51) **Int. Cl.**

H04W 4/029	(2018.01)
G06Q 20/20	(2012.01)
G06Q 30/02	(2012.01)
G06Q 50/12	(2012.01)
H04L 29/06	(2006.01)
H04W 4/00	(2018.01)
H04W 88/02	(2009.01)
H04L 29/08	(2006.01)

(52) **U.S. Cl.**

CPC ***G06Q 30/0281*** (2013.01); ***G06Q 30/06*** (2013.01); ***G06Q 50/12*** (2013.01); ***H04L 29/06*** (2013.01); ***H04L 67/12*** (2013.01); ***H04W 4/00*** (2013.01); ***H04W 4/029*** (2018.02); ***H04W 88/02*** (2013.01); *H04L 69/329* (2013.01); *Y04S 40/18* (2018.05)

(58) **Field of Classification Search**

USPC 705/7.22, 15, 21, 14.64, 14.1; 235/375, 235/380; 455/456.3, 404.2, 414.2

See application file for complete search history.

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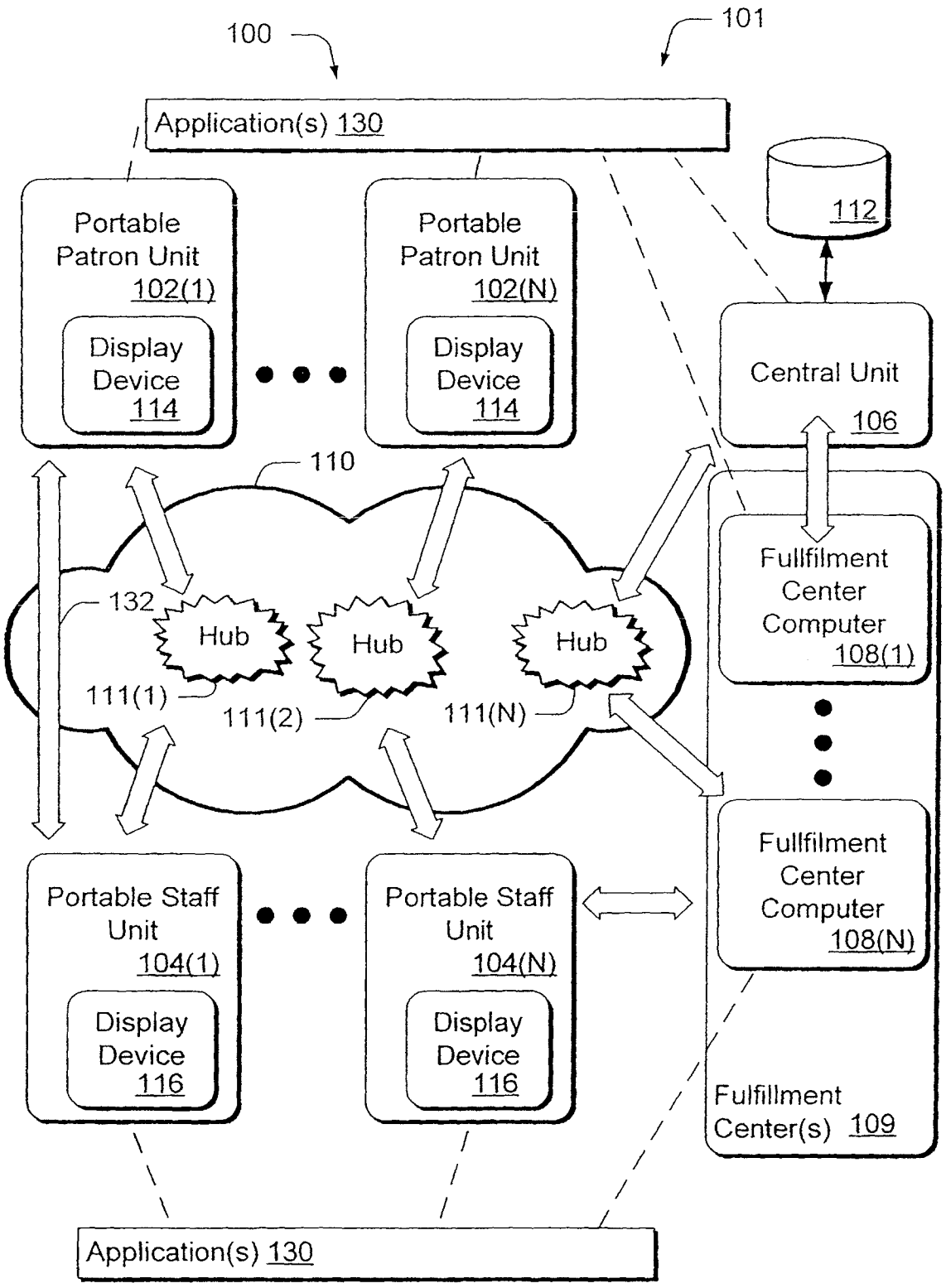
100
101
Application(s) 130
112
Portable Patron Unit 102(1)
Display Device 114
Portable Patron Unit 102(N)
Display Device 114
Central Unit 106
110
132
Hub
Hub
Hub
111(1)
111(2)
111(N)
Fullfilment Center Computer 108(1)
Fullfilment Center Computer 108(N)
Portable Staff Unit 104(1)
Display Device 116
Portable Staff Unit 104(N)
Display Device 116
Fulfillment Center(s) 109
Application(s) 130

Fig. 1

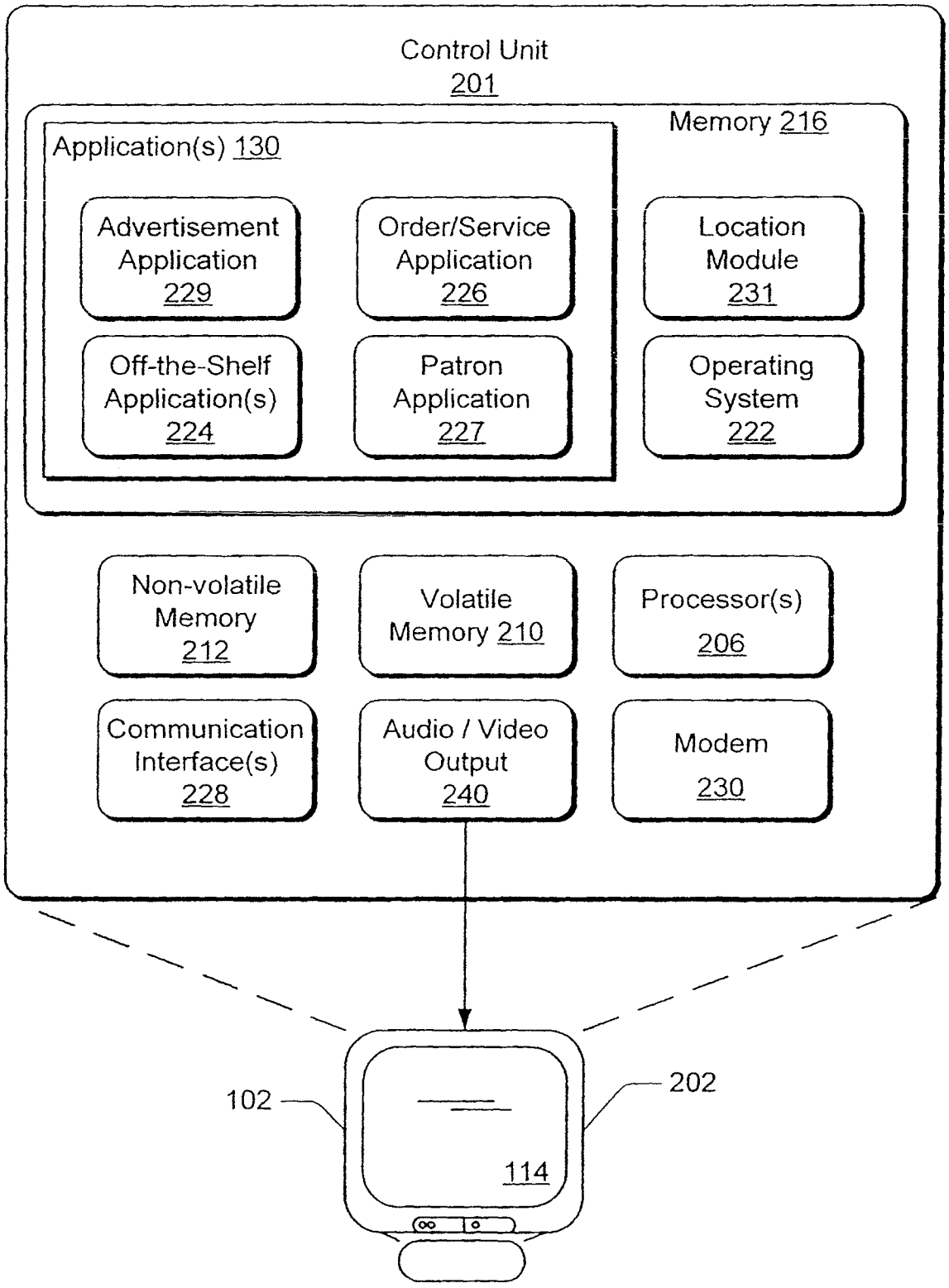
Control Unit
201
Memory 216
Application(s) 130
Advertisement Application 229
Order/Service Application 226
Location Module 231
Off-the-Shelf Application(s) 224
Patron Application 227
Operating System 222
Non-volatile Memory 212
Volatile Memory 210
Processor(s) 206
Communication Interface(s) 228
Audio / Video Output 240
Modem 230
102
202
114

Fig. 2

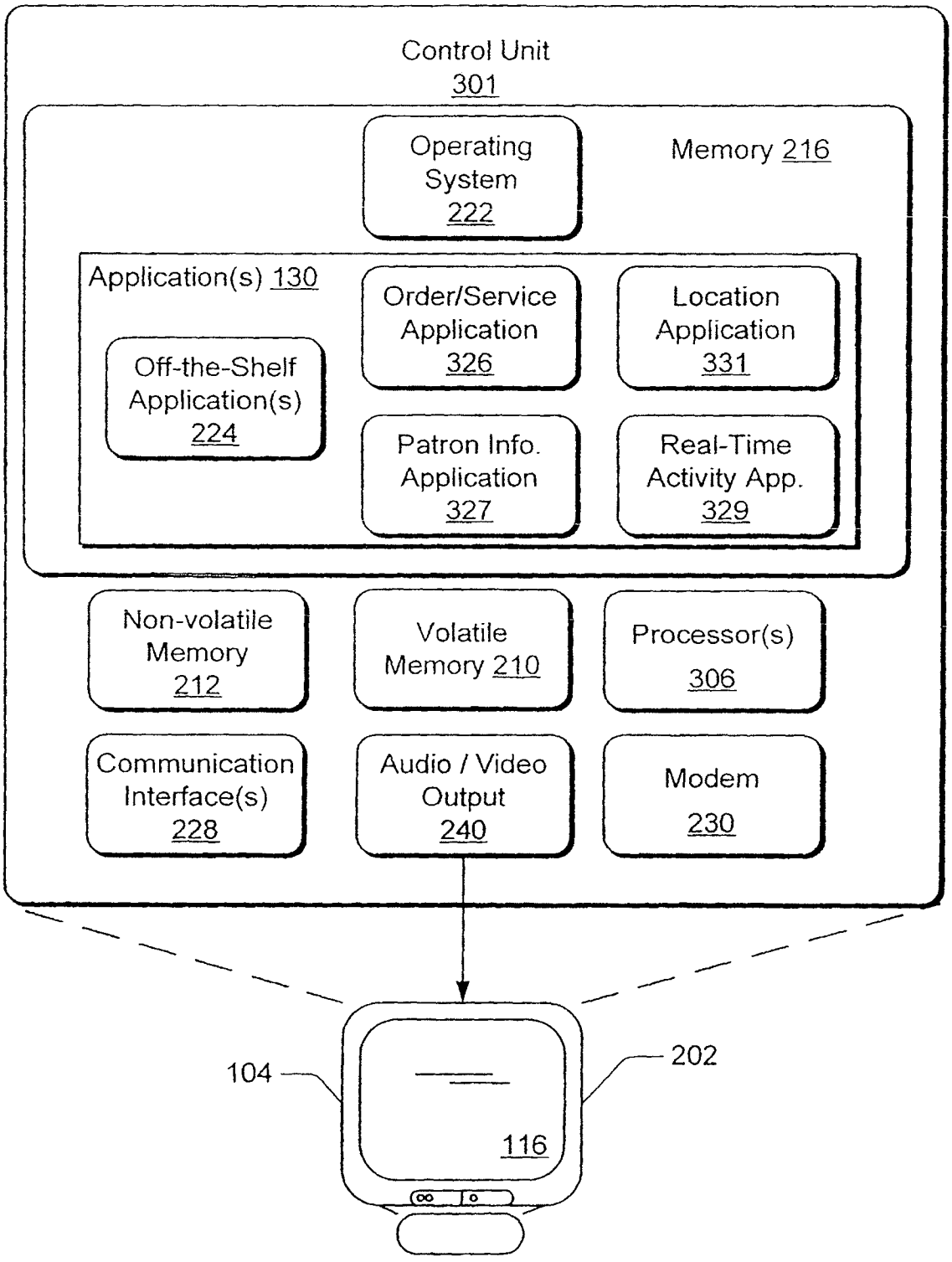
Control Unit
301
Operating System 222
Memory 216
Application(s) 130
Off-the-Shelf Application(s) 224
Order/Service Application 326
Location Application 331
Patron Info. Application 327
Real-Time Activity App. 329
Non-volatile Memory 212
Volatile Memory 210
Processor(s) 306
Communication Interface(s) 228
Audio / Video Output 240
Modem 230
104
202
116

Fig. 3

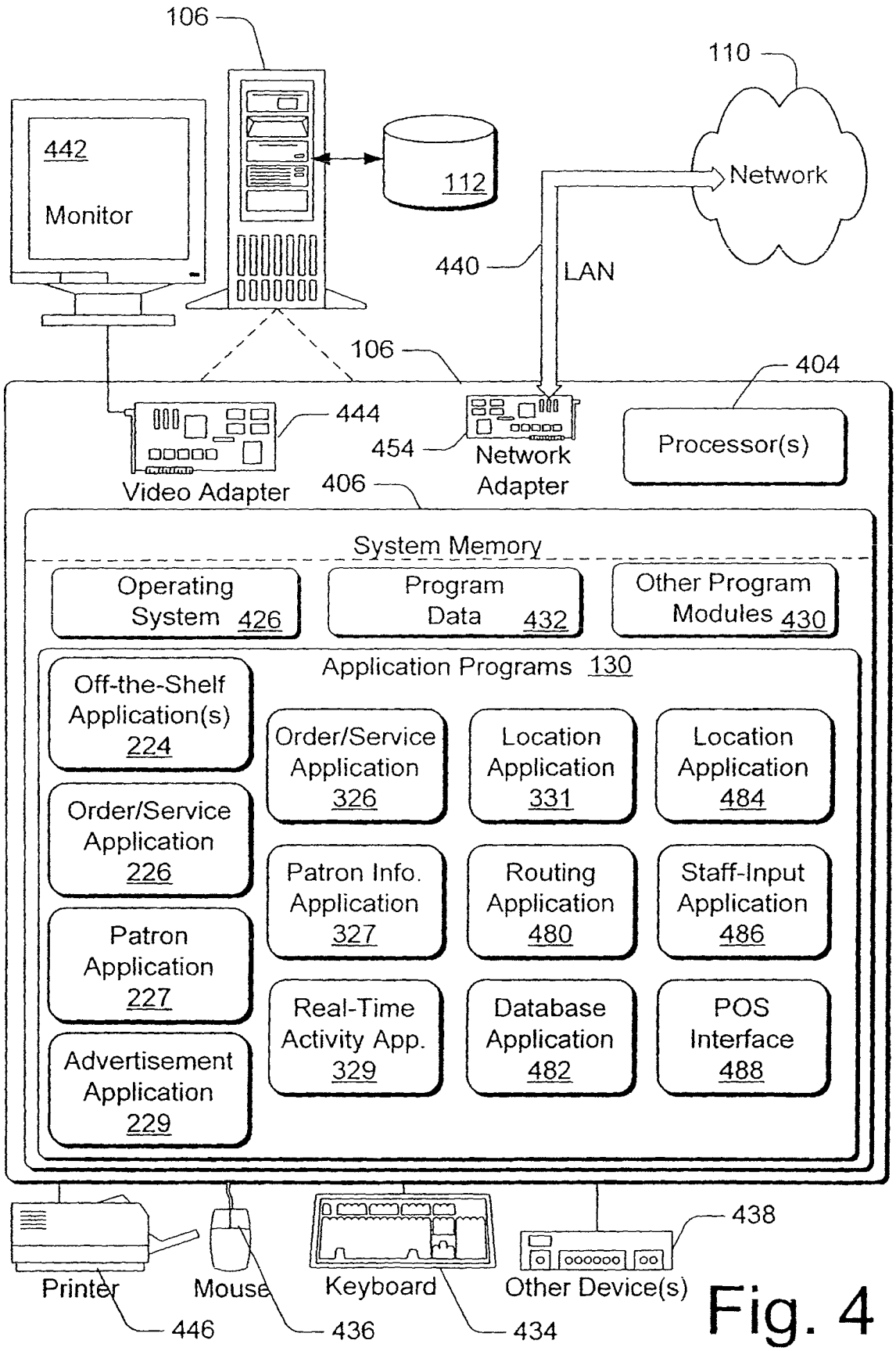
106
110
442
Monitor
112
Network
440
LAN
106
404
444
454
Network Adapter
Processor(s)
Video Adapter
406
System Memory
Operating System 426
Program Data 432
Other Program Modules 430
Application Programs 130
Off-the-Shelf Application(s) 224
Order/Service Application 226
Patron Application 227
Advertisement Application 229
Order/Service Application 326
Location Application 331
Location Application 484
Patron Info. Application 327
Routing Application 480
Staff-Input Application 486
Real-Time Activity App. 329
Database Application 482
POS Interface 488
438
Printer
Mouse
Keyboard
Other Device(s)
446
436
434

Fig. 4

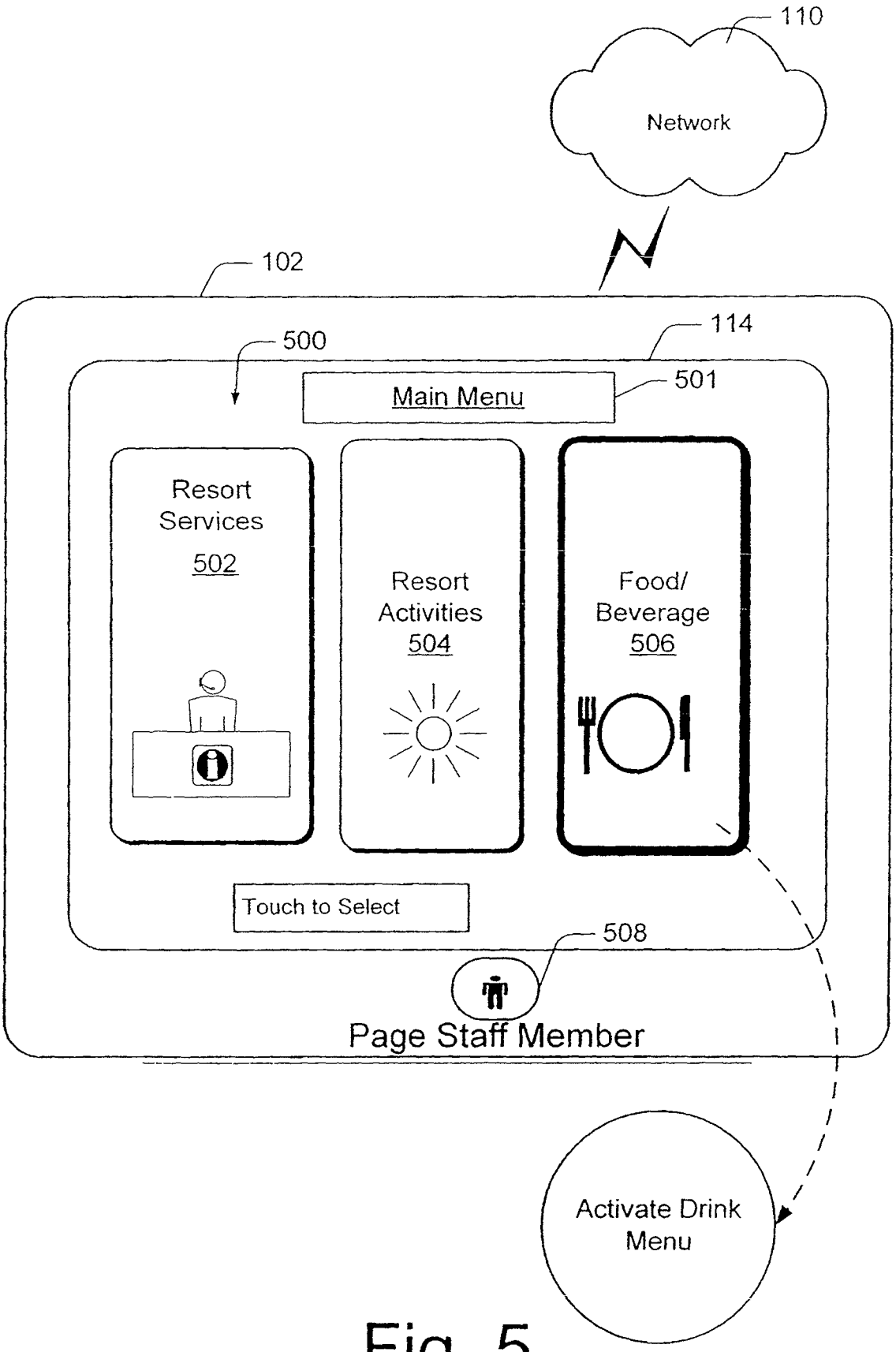
110
Network
102
500
114
Main Menu
501
Resort Services
502
Resort Activities
504
Food/ Beverage
506
Touch to Select
508
Page Staff Member
Activate Drink Menu

Fig. 5

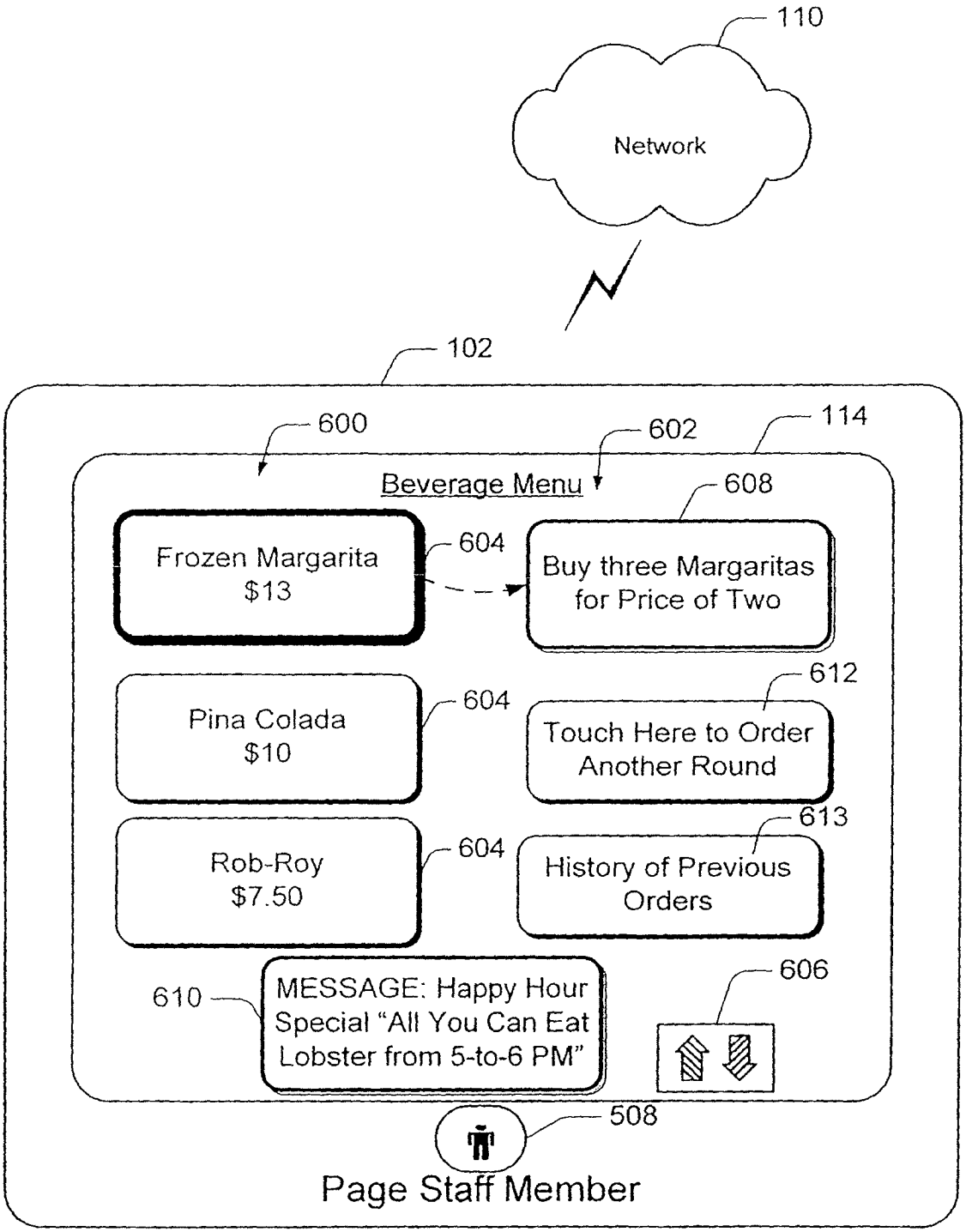
110
Network
102
600
602
114
Beverage Menu
608
Frozen Margarita
$13
604
Buy three Margaritas
for Price of Two
612
Pina Colada
$10
604
Touch Here to Order
Another Round
613
Rob-Roy
$7.50
604
History of Previous
Orders
610
MESSAGE: Happy Hour
Special "All You Can Eat
Lobster from 5-to-6 PM"
606
508
Page Staff Member

Fig. 6

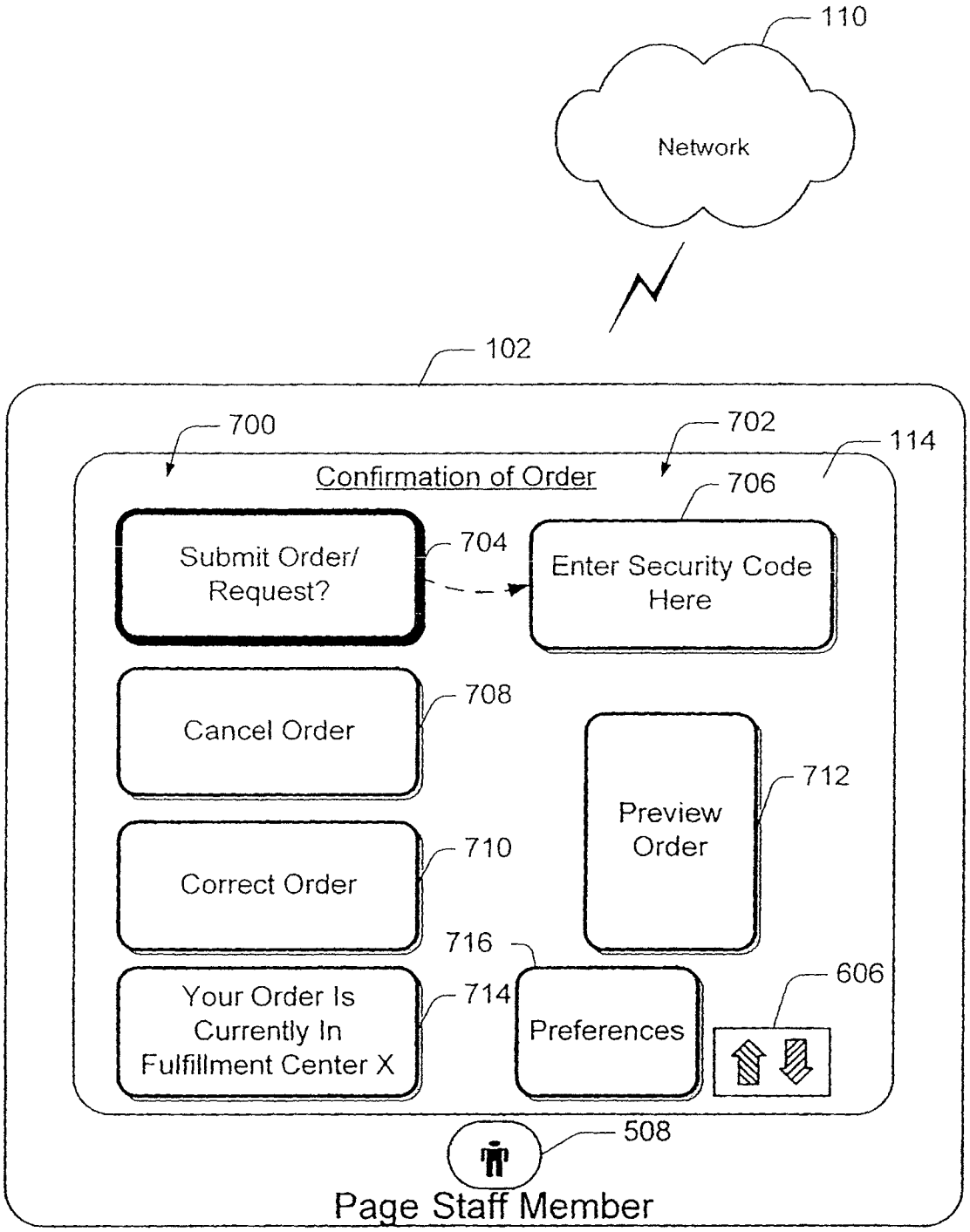
110
Network
102
700
702
114
Confirmation of Order
706
Submit Order/ Request?
704
Enter Security Code Here
Cancel Order
708
Preview Order
712
Correct Order
710
716
Your Order Is Currently In Fulfillment Center X
714
Preferences
606
508
Page Staff Member

Fig. 7

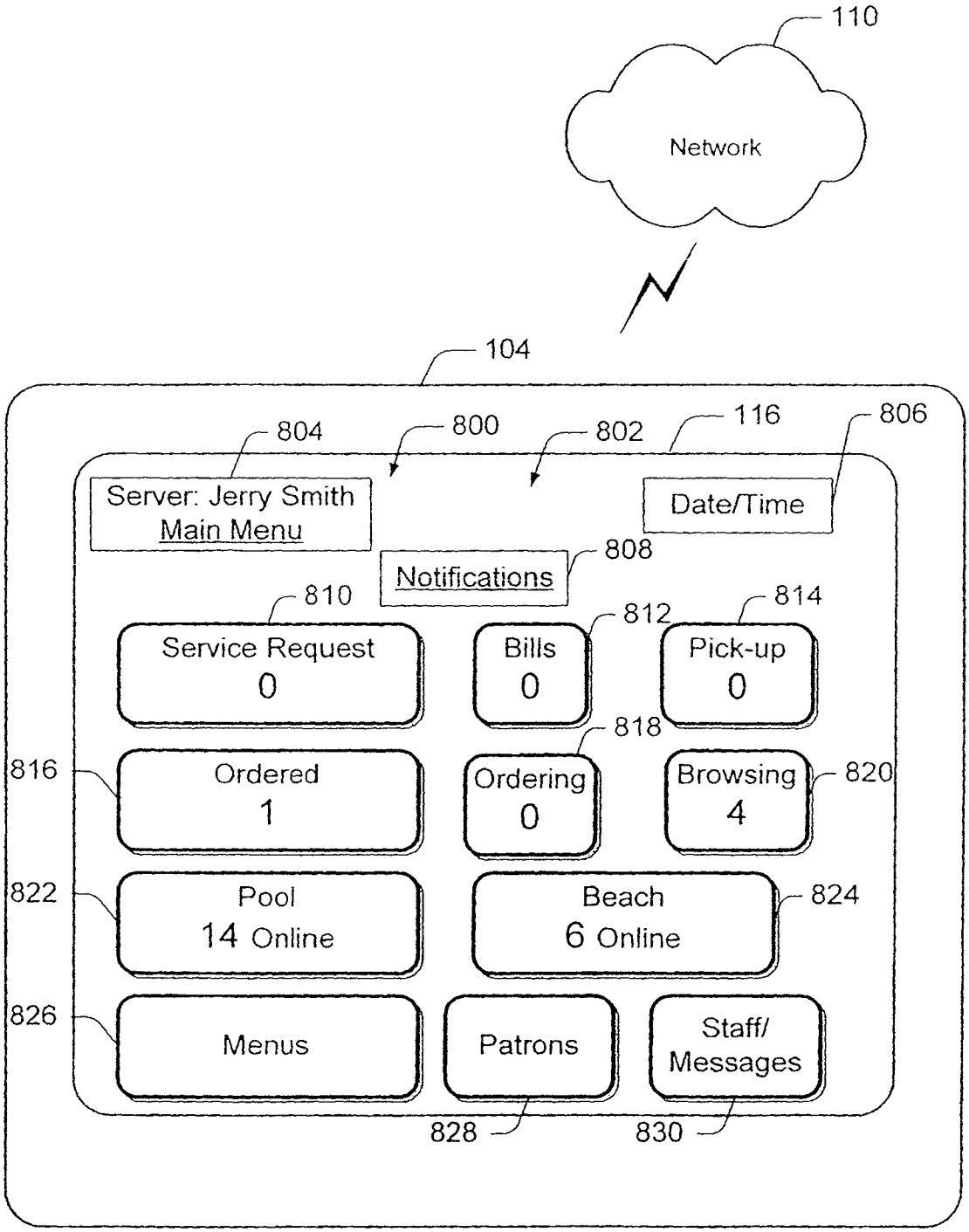
110
Network
104
804
800
802
116
806
Server: Jerry Smith
Main Menu
Date/Time
808
Notifications
810
812
814
Service Request
0
Bills
0
Pick-up
0
818
816
Ordered
1
Ordering
0
Browsing
4
820
822
Pool
14 Online
Beach
6 Online
824
826
Menus
Patrons
Staff/
Messages
828
830

Fig. 8

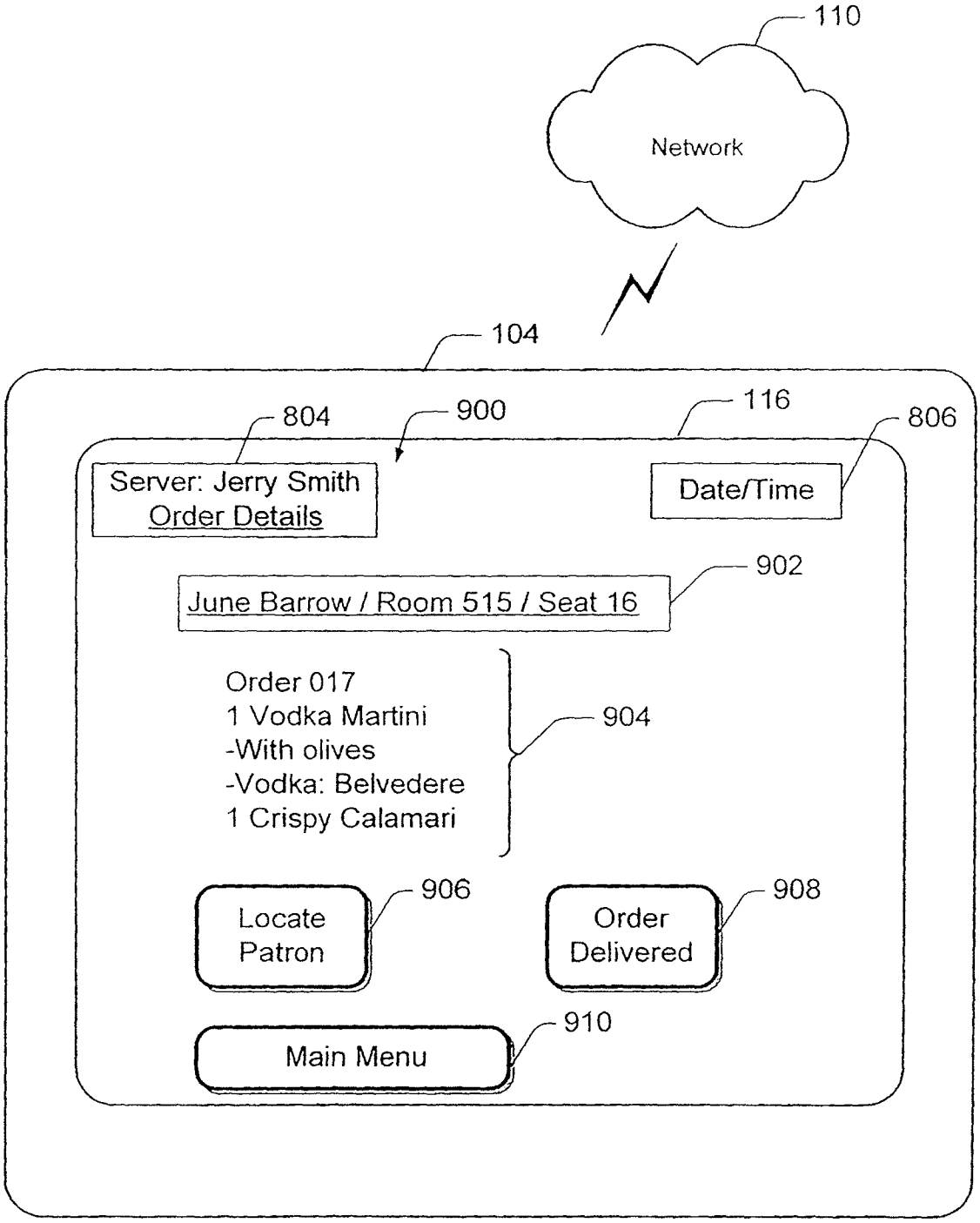
110
Network
104
804
900
116
806
Server: Jerry Smith
Order Details
Date/Time
902
June Barrow / Room 515 / Seat 16
Order 017
1 Vodka Martini
-With olives
-Vodka: Belvedere
1 Crispy Calamari
904
906
Locate
Patron
908
Order
Delivered
910
Main Menu

Fig. 9

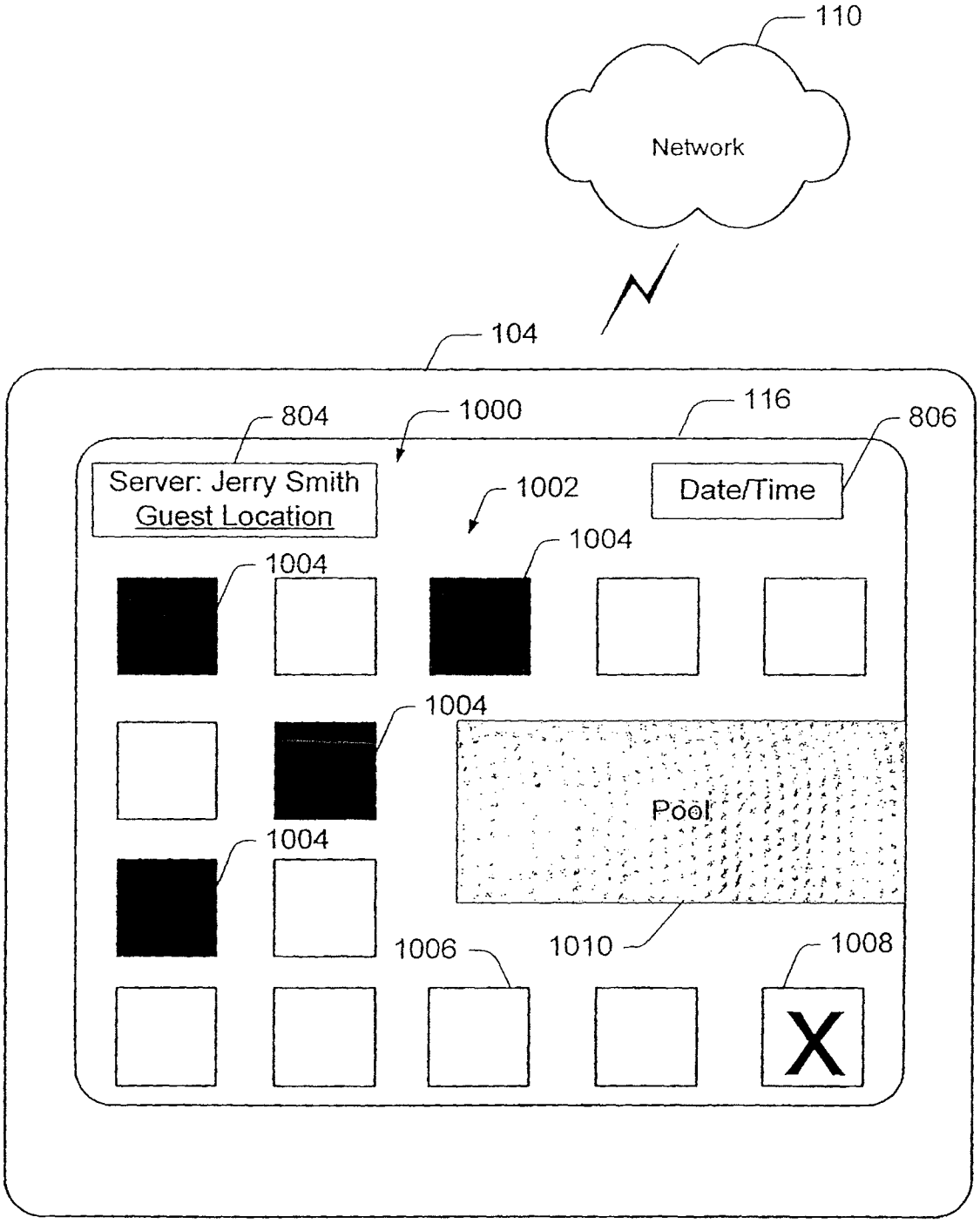
110
Network
104
804
1000
116
806
Server: Jerry Smith
Guest Location
1002
Date/Time
1004
1004
1004
1004
Pool
1006
1010
1008
X

Fig. 10

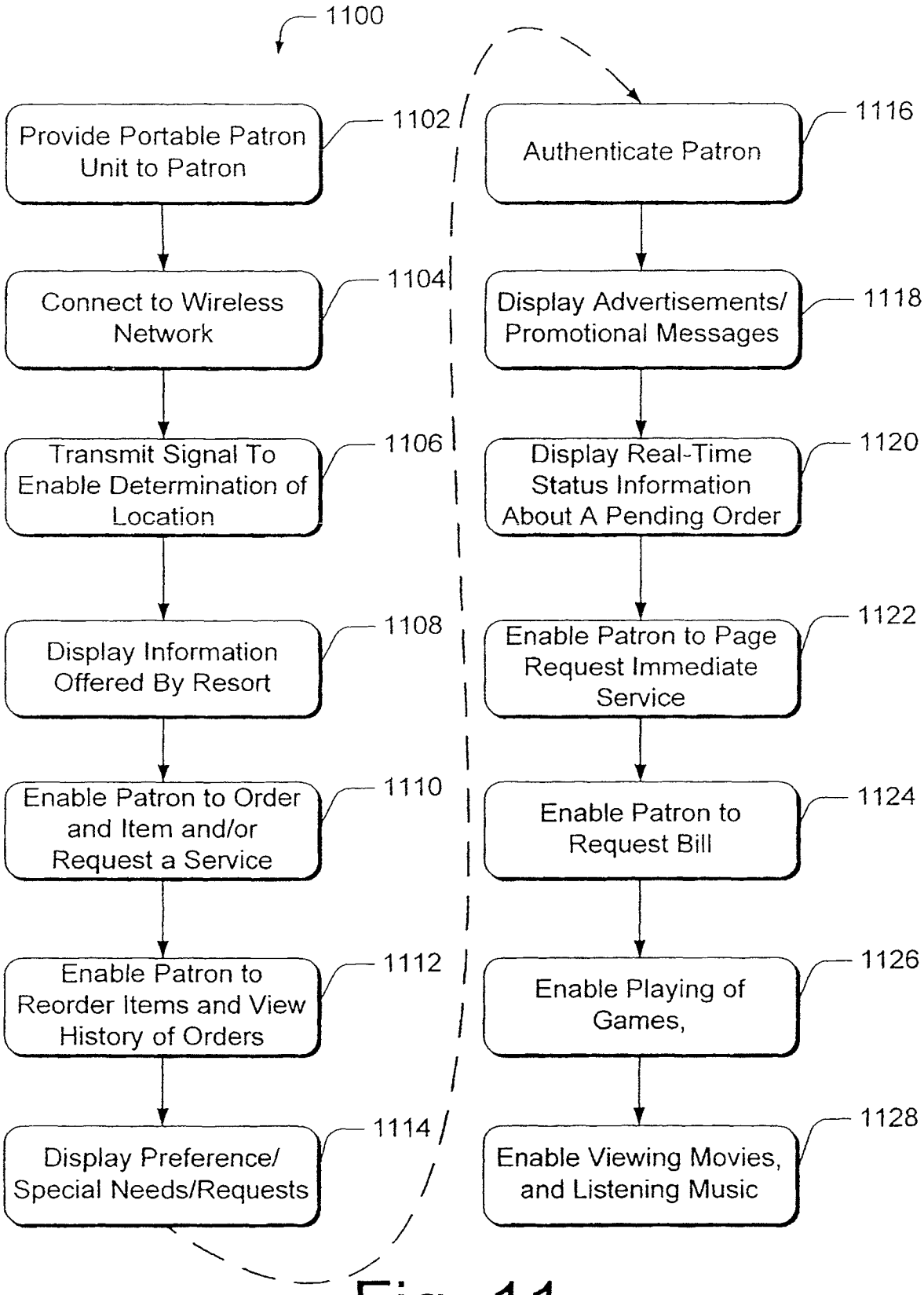
1100
Provide Portable Patron Unit to Patron
1102
Connect to Wireless Network
1104
Transmit Signal To Enable Determination of Location
1106
Display Information Offered By Resort
1108
Enable Patron to Order and Item and/or Request a Service
1110
Enable Patron to Reorder Items and View History of Orders
1112
Display Preference/ Special Needs/Requests
1114
Authenticate Patron
1116
Display Advertisements/ Promotional Messages
1118
Display Real-Time Status Information About A Pending Order
1120
Enable Patron to Page Request Immediate Service
1122
Enable Patron to Request Bill
1124
Enable Playing of Games,
1126
Enable Viewing Movies, and Listening Music
1128

Fig. 11

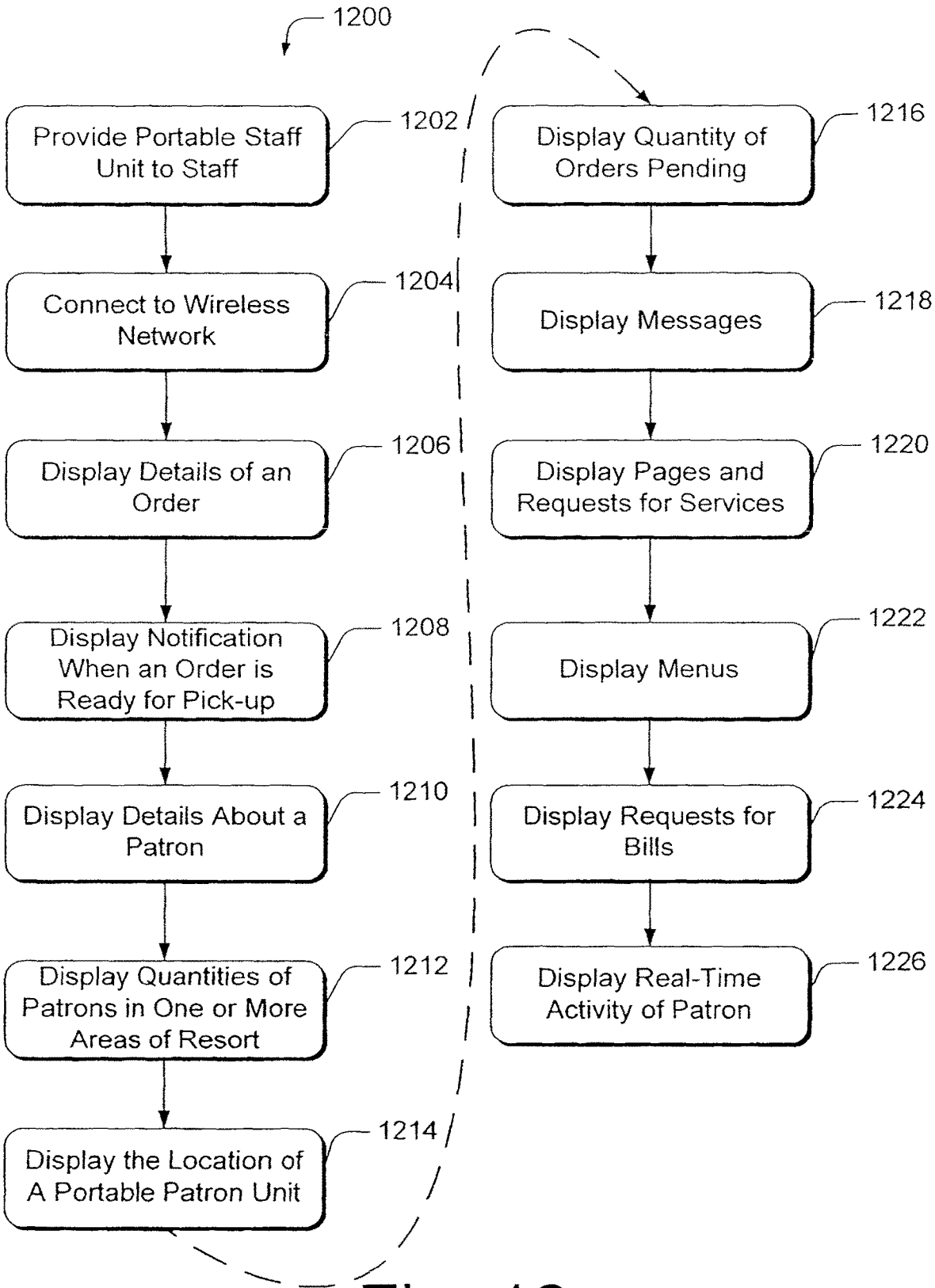
1200
Provide Portable Staff Unit to Staff
1202
Connect to Wireless Network
1204
Display Details of an Order
1206
Display Notification When an Order is Ready for Pick-up
1208
Display Details About a Patron
1210
Display Quantities of Patrons in One or More Areas of Resort
1212
Display the Location of A Portable Patron Unit
1214
Display Quantity of Orders Pending
1216
Display Messages
1218
Display Pages and Requests for Services
1220
Display Menus
1222
Display Requests for Bills
1224
Display Real-Time Activity of Patron
1226

Fig. 12

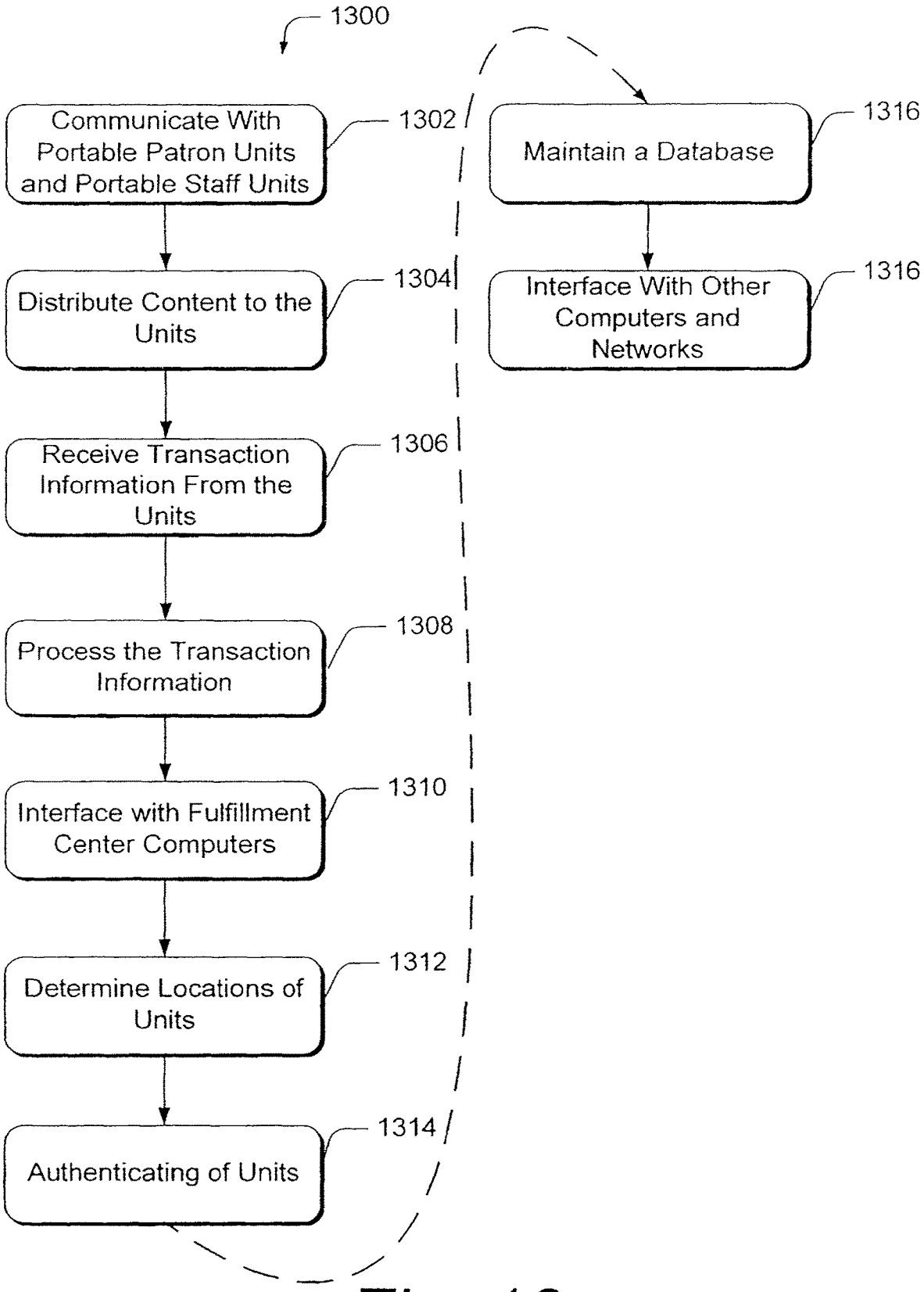
1300
Communicate With Portable Patron Units and Portable Staff Units
1302
Distribute Content to the Units
1304
Receive Transaction Information From the Units
1306
Process the Transaction Information
1308
Interface with Fulfillment Center Computers
1310
Determine Locations of Units
1312
Authenticating of Units
1314
Maintain a Database
1316
Interface With Other Computers and Networks
1316

Fig. 13

PATRON SERVICE SYSTEM AND METHOD

CROSS-REFERENCE TO RELATED APPLICATIONS

This application is a continuation of and claims priority to U.S. application Ser. No. 15/820,195, filed Nov. 21, 2017, which is a continuation of U.S. application Ser. No. 14/317,347, filed on Jun. 27, 2014, now abandoned, which is a continuation of U.S. application Ser. No. 13/073,368, filed Mar. 28, 2011, now U.S. Pat. No. 9,202,244, which issued on Dec. 1, 2015, which is a continuation of Ser. No. 10/665,525, filed on Sep. 19, 2003, now U.S. Pat. No. 7,945,477, which issued on May 17, 2011, which claims the benefit of U.S. Provisional Application No. 60/412,863, filed on Sep. 23, 2002, the disclosures of which are expressly incorporated herein by reference in their entireties.

TECHNICAL FIELD

This invention relates to systems and methods for providing services to patrons at resorts, stadiums, arenas, and other venues.

BACKGROUND

The world's leading luxury and upscale hotels, resorts, cruise lines, vacation destinations, and other public venues often differentiate themselves in a competitive market by promising and attempting to deliver exceptional service and convenience to their patrons, such as guests, customers, spectators, visitors, clientele, and other clients (hereinafter referred to collectively as "patrons"). Successfully delivering on the promise of outstanding service not only attracts repeat business, but can also generate greater revenue and increased profitability. At the same time, patrons that these properties attract have elevated expectations of service, including increased levels of attention, convenience, speed and control. The service delivery challenge for the resort is to attend quickly to patrons when the require service, to fulfill patrons' requests in a timely and efficient manner, and finally to locale a patron for delivery of their order.

Despite their high expectations, patrons at luxury and upscale resorts currently face several inconveniences in ordering food, beverages, and other amenities and services while on the beach, at the pool and in other areas of the property. In many instances when patrons desire to place an order, they cannot find a staff member such as a server, a runner, a waiter, a waitress, beach attendant, recreational staff, an employee and other personnel (hereinafter referred to collectively as a "staff member") of an establishment in the vicinity. Often the patron is unable to attract the attention of the staff member, or the staff member may be busy attending to another patron. Additional problems arise once the order is taken, as the staff member may proceed to take additional orders before submitting initial patron's orders for fulfillment. The result is a delay in entering the initial orders to the resort's computer system (assuming there is a basic computer system) and thus delaying preparation of the order as well.

If a patron becomes tired of wailing for a staff member to take the order, the alternative is to walk, sometimes for great distances, to place an order for food, beverages, or services. Not only are patrons inconvenienced, but they also face the risks inherent in leaving children or personal belongings unsupervised and unprotected on the beach, pool deck, or other resort location.

Once the order is prepared and ready for delivery to the patron, it can be a challenge for the staff member to remember where the patron is located or to find where the patron has relocated. Oftentimes the person who took the order is often not the same person who delivers the order, or the patron has moved and is not seated where the original order was taken. The result is that patrons experience further delay in having their orders delivered.

Once a the item (such as a towel, beverage, food) has been delivered to the patron, and the staff member departs, any problem with the order (i.e., missing utensils or condiments, erroneous or ill-prepared items, etc.) requires the patron to chase after the staff member, walk to a service area, or wait for the staff member to return.

Additionally, since a staff member has no way to know if a patron is interested in ordering food or beverages, staff members may periodically "check-in" with the patron as they circulate on the beach, pool, or other locations, which sometimes results in annoying disturbances for the patron, if the patron has no interest in placing an order.

Furthermore, most resorts do not offer patrons the ability to purchase sundry items, reserve a tee time, tennis court, jet ski, or spa related appointments while seated at the beach or pool.

In an attempt to address some of the aforementioned problems, a limited number of hotels are deploying centrally-located kiosks. Unfortunately, these systems require patrons to leave their seats and walk some distance to place an order at a kiosk location. Again, not only are the patrons inconvenienced, but they also face the risks inherent in leaving children or personal belongings unsupervised and unprotected on the beach, pool deck, or other resort location when having to order from the kiosk location.

Additionally, kiosks do not enable the staff member to locate the patron for delivery of the order, thus requiring additional effort and further inconvenience to the patron if the patron must retrieve the order himself. Furthermore, in many instances there may be a line of patrons waiting to use a particular kiosk creating a further inconvenient experience for patrons when they attempt to place an order for themselves.

Some manufactures have introduced POS (point-of-sale) systems for use by staff at restaurants, which may include wireless handheld terminals, as an extension of the POS systems. These handheld terminals enable staff to input and manage patron orders at a distance. Unfortunately, these devices typically only allow the staff member, to take and transmit the order on behalf of the patron. The patron must still wait for a staff member to arrive so that the patron may initiate an order. Additionally, these systems do not lend themselves in many areas of a resort. For example, there remains the problem of locating the patron in a pool or beach environment after the order is taken. This problem is further exacerbated when the staff member who took the order is not the same person who delivers the order. Thus, centrally-located kiosks for patron use and handheld POS devices for a staff member's use, both are of limited effectiveness and, thus do not fully address the problems of both the patron and the resort.

The impact on the resort caused by these service failures is significant, and includes decreased patron satisfaction, higher costs through service inefficiencies, and missed opportunities to increase property revenues per patron, decreased repeat patron business, and decreased reputation/rating, etc.

SUMMARY

A patron service system and method is described herein with reference to several exemplary implementations.

For example, in one described implementation, portable patron units are provided to patrons for use in a resort or other establishment. The portable patron units are mobile wireless devices that include interactive display screens. The portable patron units enable patrons to interact, order items, request services, browse information associated with the resort and/or other information, wirelessly. Portable staff units are provided to staff members for use in the resort or other establishment. The portable staff units are also mobile wireless devices that include interactive display screens. The portable staff units, enable staff members to view information about orders and/or requests entered by patrons made by the patrons wirelessly. The portable staff units can also display locations of the portable patron units to enable staff members to locate portable patron units when delivering items, servicing requests, etc.

This implementation as well as others is described below when read in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

The detailed description is described with reference to the accompanying figures. In the figures, the left-most digit(s) of a reference number identifies the figure in which the reference number first appears. It should be noted that the figures are not drawn to scale and are for illustration purposes only.

FIG. **1** is a block diagram illustrating an exemplary patron service system suitable for use in a resort.

FIG. **2** illustrates an exemplary portable patron unit.

FIG. **3** illustrates an exemplary portable staff unit.

FIG. **4** illustrates an example of a central unit within which application programs and other functionalities described herein can be either fully or partially implemented.

FIG. **5** illustrates an exemplary display screen rendered on a display device of a portable patron unit.

FIG. **6** illustrates an exemplary display screen presented to patrons on display device after selecting a beverage icon.

FIG. **7** illustrates an exemplary display screen presented to patrons when ordering a beverage item.

FIG. **8** illustrates an exemplary display screen rendered on a display device of a portable staff unit.

FIG. **9** illustrates an exemplary display screen providing details about an order to a staff member.

FIG. **10** illustrates an exemplary display screen on a portable staff unit for displaying locations of portable patron devices.

FIG. **11** is a flow diagram that illustrates an exemplary method of operation associated with a portable patron unit.

FIG. **12** is a flow diagram that illustrates an exemplary method of operation associated with portable staff unit.

FIG. **13** is a flow diagram that illustrates an exemplary method of operation associated with a central unit.

DETAILED DESCRIPTION

Patron Service System

FIG. **1** is a block diagram illustrating an exemplary patron service system **100** suitable for use in a resort **101**. As used herein a "resort," refers to hospitality venues, such as, but not limited to, hotels, motels, lodging centers, cruise ships, tennis resorts, camps, ski resorts, relaxation centers, inns, time-share communities, retirement communities, and any constituent parts of a particular resort, such as, but not limited to, restaurants, bars, pools, tennis courts, entertainment centers, ski slopes, beaches, spas, boating facilities, gift shops, retail locations, and so forth.

Although patron service system **100** is described herein primarily in the context of being used in a resort, it should also be noted that patron service system **100** may be used in various other venues including, but not limited to, stadiums, arenas, retail locations, zoos, transportation centers, health care settings, convalescence centers, convention centers, country clubs, museums, gambling venues, sporting events, as well as any other entertainment, retail, and recreational environments.

In one implementation, patron service system **100** is configured to service one or more patrons and staff members of resort **101**. Patron service system **100** may include one or more portable patron unit **102**(**1**), . . . , **102**(N), one or more portable staff units **104**(**1**), . . . , **104**(N), a central unit **106**, and one or more fulfillment center computers **108**(**1**), . . . , **108**(N). Patron service system **100** may form at least a portion of a network **110**.

Portable patron unit, referred to generally as reference number **102**, is provided to a patron to use at resort **101** while at a pool, beach, spa, deck, lounge, or any other areas associated with resort **101**. Portable patron unit **102** is a rugged mobile computer device with an interactive display device **114**. Portable patron unit **102** uses wireless technology to transmit and receive information from other devices associated with resort **101**. Accordingly, from the comfort of the beach, a pool lounge chair, or other various locations, a patron may view extensive menus of items, services, information, etc. that may be ordered from a user interface displayed on display device **114** of portable patron unit **102**. A patron may order food, beverages, services, and so forth, by entering information into their respective portable patron unit **102**.

In one implementation, portable patron unit **102** may be attached with a secure locking mechanism (not shown) to a patron's lounge chair, table, and so forth by a staff member of the resort. Alternatively, portable patron unit **102** may be carried by the patron or may be affixed to their person such as to a belt or wristband.

Display device **114** typically displays a user interface (to be described in more detail), which is easy to use, yet allows a great degree of choice and flexibility in accessing information. The user interface is designed to require minimal training for the patron to begin using the system. The user interface may display extensive menus of items, services, information, etc. that can be ordered or accessed and may include descriptions, pricing information, or other details. Information, such as property announcements and promotions, weather conditions, activity updates, etc., may also be displayed to the patron at the discretion of resort **101**.

The user interface may enable patrons to rapidly order standard menu items, while also allowing for extensive order customization. The user interface may also display items that the patron had previously ordered during the day or vacation period, making it easy to replicate previous orders (e.g., order "another round"). Daily specials, cross-sell, up-sell and other recommendations based on the patron's choices and any other sales and convenience features may be included in the user interface. The portable patron unit **102** may also display information relating to the status of any open order, open tab, etc. including the real-time status of any order and estimated time to that order's delivery.

A patron may also use portable patron unit **102** to page a staff member, to receive personal attention from the staff member, request immediate delivery of a bill, etc. Portable patron units may also receive an electronic bill, permitting patrons to enter credit card information, or other payment

information without the need for a staff member to physically deliver the bill. Bills may also be generated automatically without the need for a bill request, depending on the system. Portable patron unit **102** may offer a patron the ability to play games, access the Internet, receive and send e-mail, conduct two-way conversations, watch videos, watch movies, listen to music, among other features. The ability to conduct two-way conversations may assist in allowing the patron or a staff member to better communicate with each other in the event there is a question about an order, such as with a custom meal order.

A portable staff unit, referred to generally as reference number **104**, is a durable mobile computer device with an interactive display device **116** that uses wireless technology to transmit and receive information from other devices associated with resort **101**, such as central unit **106**. Portable staff unit **104** is provided to a staff member (such as a server, a runner, a waiter, a waitress, beach attendant, recreational staff, an employee and other personnel associated with an establishment (hereinafter "staff member")) of resort **101** enabling, the staff member to service patrons. Portable staff unit **104** may display information on patrons, including order status, which then can be used to service the patrons effectively and efficiently. For instance, portable staff unit **104** is configured to receive notification of open orders made by a patron including details of one or more pending orders. The portable patron unit **104** is designed to be mobile and carried with the staff member, such as with a serving tray, on a wristband, or affixed to a belt, etc.

Portable staff unit **104** is capable of displaying information for the purpose of assisting the staff member to better service the patron. For instance, portable staff unit **104** may display a location of a particular portable patron unit **102**. This feature may be useful in locating a patron that has placed an order or requested a service, so that a staff member can deliver the patron's order or service the request directly to the patron in an efficient and prompt manner. The portable staff unit **104** may also display information about the particular patron such as the patron's name, room number, previous orders, specific items ordered, billing status, preferences, special needs, and so forth. Such information may by useful to the staff member so they may address the patron by name and understand or anticipate the patron's needs, even without personally contacting the patron.

Portable staff units **104** may also assist a staff member by displaying real-time information or actions performed by patrons on their portable patron units **102** as they are being performed, such as displaying the number of patrons browsing on their portable patron unit **102**, displaying particular activities performed by a particular patron, etc. Such real-time information may prepare a staff member for future orders not yet received and give the staff member a head start on an order even though the patron may not have completed and submitted the order.

Portable staff unit **104** may also receive page messages from a patron, indicating the name and location of a patron who requires immediate service or personal attention. Portable staff unit **104** may also be configured to perform all functions that a portable patron unit **102** can perform, such as placing an order, which allows a staff member to instantly transmit an order taken verbally if a patron prefers not to enter the order directly on the portable patron unit **102** or if a patron does not currently have a portable patron unit **102**. A staff member can also "take over" an order from portable patron unit **102**, and edit and transmit the order if a patron is having difficulty with the system.

In terms of billing status, portable staff unit **104** can display open tabs, and when a patron has requested delivery of their bill, which can eliminate one of the more frustrating waiting periods in a patron's experience. In addition, a staff member can use portable staff unit **104** to perform administrative and patron and service functions, such as transferring a patron to another portable patron unit **102** if, for example, the patron wishes to relocate from the beach to the pool and the portable patron unit is locked to a piece of furniture (assuming the patron does not simply carry the portable patron unit with them).

Central unit **106** is typically a server side computer, which controls wireless communication among portable patron units **102** and portable staff unit **104**, and distributes content to portable patron units **102** and portable staff units **104**. Central unit **106** also may serve as a gateway to other resort systems such as Point-of-Sale management software running on central unit **106** or other computers.

Central unit **106** typically receives and authenticates orders made by portable patron units **102** and then routes the orders to an appropriate fulfillment center computer **108**(**1**), . . . , **108**(N) associated with a fulfillment center **109**, such as a kitchen, bar, spa, gift shop, etc. Once the order is prepared, a staff member from the particular fulfillment center **109** alerts central unit **106**, typically via a fulfillment center computer **108**, which in turn alerts one or more portable staff units **104** that the order is ready for pickup and delivery to a patron. Central unit **106** also may transmit other information to the portable patron units **102** such as advertisements, messages, resort information, Internet access, and other information that may be transmitted in response to a patron's request or without a specific patron's request. Central unit **106** also may maintain a database **112** including data associated with a history of transaction data, patron preferences, patron profiles, and various other information.

One or more programmable software applications **130** may execute on central unit **106** (i.e., one or more servers) when handling and servicing requests from client devices, such as portable patron unit **102** and portable staff unit **104**. Programmable software applications **130** may also reside on one or more client devices (such as portable patron unit **102**, portable staff unit **104** and/or fulfillment center computer computers **108**). As shall be described in further detail, components of programmable software applications **130** may be configured to perform any one of a variety of different services associated with patron service system **100**. Examples of services include: login verification for patrons using portable patron units **102**; notification to portable staff units **104** that an item ordered by a patron is ready for delivery from a fulfillment center **109** to a patron; maintaining one or more databases **112** associated with patron service system **100**; routing orders to appropriate fulfillment centers; providing food and drink menus to particular portable patron units **102**; enabling patrons to order different items; and so on. The services can be combined with each other and with other applications to build intelligent interactive experiences on both the portable patron units **102** and portable staff units **104**.

Although only one central unit **106** is shown in the exemplary illustration, more than one central unit **106** may be deployed in patron service system **100**. Additionally, some or all the functionality performed by central unit **106**, may be performed in a distributed fashion by one or more portable patron units **102**, one or more portable staff units **104**, and/or one or more fulfillment center computers **108**.

In one implementation, network **110** includes one or more Wi-Fi (wireless fidelity) hubs **111**(**1**), **111**(**2**), . . . , **111**(N)

that are IEEE 802.11 standard protocol compatible, such as standard versions 802.11b, 802.11g, etc. Accordingly, portable patron units **102**, portable staff units **104**, central computer **106**, and fulfillment center computers **108** may communicate with network **110** wirelessly. Accordingly, portable patron units **102** and portable staff units **104** are configured to communicate with other devices wirelessly, allowing them to move freely in designated areas of an resort **101**, such as the beach, pool, lounge, etc. Typically, these designated areas are located within a reception range of approximately 400 feet in any direction of the one or more wireless hubs (such as hubs **111**(**1**), **111**(**2**), . . . , **111**(N), which are referred to as "hot spots."

Network **110** may also use one or more other types of wireless networks, such as Bluetooth compatible networks, or future technologies. Network **110** may also include a combination of wireless-based and wired/optical based communication links. For instance, portable patron units **102** and portable staff units **104** may use wireless links to receive and transmit data, whereas fulfillment center computers **108** may use wired or optical links to access and transmit data. Additionally, it may also be possible for various devices to communicate directly with other devices without using network **110** as a communication link. For example, it may be possible for portable patron unit **102**(**1**) to communicate directly with portable staff unit **104**(**1**) via a wireless link **132**. Network **110** may also include access to other networks, such as the Internet.

Accordingly, portable patron units **102**, portable staff units **104**, central unit **106**, and fulfillment center computers **108** are designed to either run or interface with one or more programmable software applications **130** that are programmable application components, that are reusable, and that interact programmatically over network **110** or through other communication links, typically through standard Web protocols, such as extensible markup language (XML), hypertext transport protocol (HTTP), and simple mail transfer protocol (SMTP). However, other means of interacting with over network **110** may be used, such as simple object access protocol (SOAP), remote procedure call (RPC) or object broker type technology.

Thus, patron service system **100** offers a comprehensive and integrated solution to meet the needs of both the patron and a resort. Patrons benefit from faster service, greater control over their service, increased convenience, and improved personalized attention. Resort **101** benefits from the ability to enhance the patron's experience and increase patron satisfaction, the opportunity to generate higher incremental revenues, and the savings from faster and more efficient operations.

Exemplary patron service system **100** is only one example of a computing system and is not intended to suggest any limitation as to the scope of use or functionality of the system. Neither should patron service system **100** be interpreted as having any dependency or requirement relating to any one or combination of components illustrated in the exemplary computing environment shown in FIG. **1**.

Having introduced exemplary patron service system **100** and its environments, it is now possible to describe patron service system **100** in more detail.

Exemplary Portable Patron Unit

FIG. **2** illustrates an exemplary portable patron unit **102**. Portable patron unit **102** is typically a handheld device that may be carried by a patron, attached to a patron's lounge chair, table, other furniture, or attached directly to the patron, such as the patron's belt or a wristband.

An outer protective casing, referred to as packaging **202**, is designed to be highly rugged, provide protection from the sun, saltwater, chlorine, sand, suntan lotion, spilled food, and/or drink. Such casting provides protection for any or all components of portable patron unit **102**. Packaging **202** may be made of any number of materials including, but not limited to, plastic, metal, and/or wood. For example, in one implementation, packaging **202** is constructed of injection-molded high-impact polycarbonate designed to meet the IEC 529 IP 54 standards for water and dust/sand protection and may be configured into various shapes and sizes.

Portable patron unit **102** includes a display device **114**, which in one exemplary implementation is a touch-screen display device, which enables a patron to select or enter information by simply touching the screen. To provide excellent visibility to a patron, information is typically displayed large enough on display device **114** to enable a person suffering from mild myopia to view content on display device **114** without the aid of corrective lenses. For example, in one implementation display device **114** is a five-inch grayscale QVGA transflective, backlit touch-screen LCD (liquid crystal display) and font sizes are displayed big enough to readily view them on display device **114**. Additionally, magnifying materials (not shown) may be used in conjunction with display device **114** to enlarge content displayed therein. Various other types of display screens, sizes, and shapes may be chosen to implement display device **114**. Additionally, display device **114** can be implemented without the benefit of touch-screen technology and rely on other types of input devices such as a keyboard, buttons, input pads, etc., to enter information into the portable patron unit **102**.

Portable patron unit **102** also may include audio generators (such as one or more speakers not shown) for dissemination of audio content. The audio content may be in various forms and may be in conjunction with visual content.

Other elements such as lights, LEDs, batteries, power supplies, charging connections, microphones, vibrating devices, antennae and so forth are also not shown in FIG. **2**, but may be a part of the exemplary portable patron unit **102**.

Typically, portable patron unit **102** contains a control unit **201**, which controls the operation of portable patron unit **102**. Control unit **201** includes one or more processors **206** (e.g., any of microprocessors, controllers, and the like), which process various instructions to control the operation of portable patron unit **102** and to communicate with other electronic and computing devices.

Control unit **201** can be implemented with one or more memory components (i.e., memory **216**), examples of which include volatile memory **210** (e.g., a random access memory (RAM) and the like), and a non-volatile memory **212** (e.g., ROM, Flash, EPROM, EEPROM, a hard disk drive, any type of magnetic or optical storage device, and the like). The one or more memory components store computer-executable instructions in the form of program applications, routines, modules and other applications. Additionally, various forms of information and/or data can be stored in volatile or non-volatile memory. Alternative implementations of control unit **201** can include a range of processing and memory capabilities, and may include any number of memory components other than those illustrated in FIG. **2**. For example, full-resource portable patron units **102** can be implemented with substantial memory and processing resources, or low-resource portable patron units **102** can be implemented with limited processing and memory capabilities.

An operating system **222**, such as Windows® CE operating system from Microsoft® Corporation or other operat-

ing systems, and one or more application programs **224** may be resident in memory **216** and execute on processor(s) **206** to provide a runtime environment. A runtime environment facilitates extensibility of portable patron unit **102** by allowing various interfaces to be defined that, in turn, allow application programs **130** to interact with control unit **201**. The application programs **130** can include off-the-shelf program applications **224**, such as a browser to browse the Web (e.g., "World Wide Web"), e-mail application to e-mail messages, and other off-the-shelf programs.

The application programs **130** can also include one or more other programs configured to provide resort specific user interfaces including menus and information directed to patrons. Such application programs may include: an order/service application **226**, a patron application **227**, and an advertisement application **229**. Each of these patron oriented application programs typically executes on processor(s) **206** and may be stored in non-volatile memory **212** and/or volatile memory such as some form of volatile memory **210**.

Order/service application **226** generally facilitates displaying interactive menus for ordering items, requesting services, and viewing information offered by resort **101** including viewing activities. Examples of items that may be ordered include, but are not limited to, food, beverages, rental equipment, and sundry items. Examples of services include, but are not limited to, requesting a bill, paging a staff person, scheduling a spa appointment, making a reservation, and so forth. Order/service application **226** also may facilitate displaying information associated with scheduling activities, which include but are not limited to, reserving a tennis court, reserving a tee time, requesting a boat, browsing and selecting tours, etc. Order/service application **226** also may prompt portable patron unit **102** to page a staff member when a patron selects a menu option, hard button, or other selection means, which activates a paste mode.

Patron application **227** generally facilitates authenticating a patron's credentials/identification when logging onto the system or prior to submitting an order or a request. Authentication may involve requesting that the patron enter a security code or provide a biometric sample, such as a fingerprint as a security measure when logging onto the system or placing orders. Patron application **227** also may facilitate receiving or displaying personal preference information, needs, or requests of the patron. Preference information, needs, or requests may include, but are not limited to, dietary restrictions, medical needs, emergency contacts, and so forth. Patron application **227** may also facilitate receiving and viewing personal as well as general messages, such as a phone message left for a patron, or an announcement from resort **101** of a scheduling change, such as a buffet opening delay.

Advertisement application **229** generally facilitates displaying promotional messages and/or advertisements on display device **114**. Advertisement application **229** may also facilitate displaying information such as cross-sell and/or up sell recommendations based on an item ordered and/or service requested by a patron. For instance, a cross-sell recommendation may include providing alternative or competing brands of food or drink, while an up sell recommendation may include offering a more expensive, promotional, or better quality food or drink as an alternative to what the patron may have selected.

Other applications, routines, programs and modules may execute on processor(s) **206**. For instance, a location module **231** executes on processor(s) **206** and resides in memory **216** and/or volatile memory **210**. Location module **231** is typically a background program that transmits information in the form of one or more signals to enable other devices to determine where portable patron unit **102** is located.

Additionally, other applications programs **130** operating in conjunction with control unit **201** of portable patron unit **102** may offer a patron the ability to play games, view and listen to music or videos, and conduct two-way conversations, etc., through one or more other application programs, routines, etc. For instance, with different storage offerings, games can be played from local memory **216** or from an online source provided by central unit **106** or via the Internet. Portable patron unit **102** may be configured to browse or access information from the Internet. Portable patron unit **102** also may include telephony access, such as Voice over Internet Protocol (VoIP) capability enabling a patron use the portable patron unit **102** to receive/make telephone calls, speak to other patrons or staff members, speak to a staff member in a fulfillment **109** and so forth.

Accordingly, application programs **130** (such as application programs **224**, **226**, **227**, and **229**), as well as module **231** execute on processor(s) **206** and can be stored as computer-executable instructions in memory of portable patron unit **102**. Although application programs **224**, **226**, **227**, **229**, and module **231** are illustrated and described as single applications or module(s), each can be implemented as one or more combined component applications or modules, and can be fully or partially received from other devices, such as one or more servers (e.g., central unit **106**).

For purposes of illustration, programs and other executable program components such as the operating system are illustrated herein as discrete blocks. However, it is recognized that such programs and components may reside at various times in different storage components of portable patron unit **102**, or other components of patron service system **100**, and may be executed by one or more processors that are not necessarily part of portable patron unit **102** (such as one or more processor(s) of central unit **106**). Additionally, programs, such as application programs **224**, **226**, **227**, **229**, and module **231**, are fully customizable.

Control unit **201** may further include one or more communication interfaces **228**, such as a Wi-Fi PC card (not shown), which enables control unit **201** to receive and transmit information wirelessly using 802.11 compliant protocols. The Wi-Fi PC card in conjunction with control unit **201** collectively forms a wireless communication unit configured to connect the portable patron unit to network **110**. Although not shown in FIG. **2**, it is appreciated that one or more antennae are used to emit and transfer signals from portable patron unit **102**. An optional modem **230** facilitates communication with other electronic and computing devices via a conventional telephone line, or other type of connection such as cable.

Control unit **201** may also include a content processor (e.g., processor(s) **206**), which can include a video encoder and/or additional processors to receive, process, and encode recorded video signals including analog video signals, as well as television system digital video signals. For example, a content processor can include an MPEG-2 or MPEG-4 (Moving Pictures Experts Group) encoder that encodes MPEG video content and/or image data. The systems described herein can be implemented for any type of video encoding format as well as for data and/or content streams that are not encoded.

Typically, video content and program data includes video data and corresponding audio data. One or more other processors, such as processor(s) **206**, may generate video and/or display content that is formatted for display on display device **114**, and generates encoded/decoded audio

data that is formatted for presentation by a presentation device, such as one or more speakers (not shown) in display device **114**. Processor(s) **206** can include a display controller (not shown) that processes the video and/or display content to display corresponding images on display device **114**. A display controller can include a graphics processor, microcontroller, integrated circuit, and/or similar video-processing component to process the images.

Control unit **201** also includes an audio and/or video output **240** that provides, or otherwise renders the audio, video, and/or display signals/data to display device **114**. Video signals and audio signals can be communicated from control unit **201** to display device **114** via any suitable video links, such as a S-video link, composite video link, component video link, or other similar communication link.

Although shown separately, some of the components of control unit **201** may be implemented in an application specific integrated circuit (ASIC). Additionally, a system bus (not shown) typically connects the various components within control unit **201**. A system bus can be implemented as one or more of any of several types of bus structures, including a memory bus or memory controller, a peripheral bus, an accelerated graphics port, or a local bus using any of a variety of bus architectures. By way of example, such architectures can include an Industry Standard Architecture (ISA) bus, a Micro Channel Architecture (MCA) bus, an Enhanced ISA (EISA) bus, a Video Electronics Standards Association (VESA) local bus, or a Peripheral Component Interconnects (PCI) bus (also known as a Mezzanine bus).

Additional components may be included in portable patron unit **102** and some components illustrated in portable patron unit **102** above need not be included. For example, a camera (not shown) could be added to portable patron unit, and modem **230** may not be included.

Exemplary Portable Staff Unit

FIG. **3** illustrates an exemplary portable staff unit **104**. Portable staff unit **104** may be similar or identical to portable patron unit **102** in terms of physical hardware and packaging. Portable staff unit **104**, nevertheless, may be implemented in various shapes and sizes, and may be configured to mount on a waiter's tray or include handles (not shown) to enable enhanced portability when carrying portable staff unit **104**.

Control unit **301** is similar to control unit **201** described above with reference to FIG. **2**, and may use many of the same types of components. Control unit **301**, however, may include different application programs **130** to provide a different runtime environment that is particularly suited for staff members of resort **101**. For example, control unit **301** may include the following application programs **130**: an order/service application **326**; a patron information application **327**; a real-time activity application **329**; and a location application **331**. Collectively, each of these program applications generate a user interface on display device **116** that enables a staff member to, for example, view details about a patron's order; determine a location of a portable patron unit; receive notification of when an order is ready for delivery and delivery to a patron; and view details about a patron, such as a room number, preference information of the patron and special needs or requests of the patron.

For example, order/service application **326** generally facilitates displaying details of an order and/or a request, such as items ordered or type of services requested by a patron. Order/service application **326** also facilities displaying a notification indicating (i) when an order or request is ready for delivery to a patron from a fulfillment center **109**, or (ii) when a patron has requested delivery of a bill or paged a staff member.

Patron information application **327** generally facilitates displaying details about a patron, such as their name, room number, history, preferences, special needs/or personal requests, and so forth.

Real-time activity application **329** generally facilitates displaying actions performed by patrons as they use their portable patron units **102** in real-time. For example, real-time activity application **329** may display a description of actions performed by a patron selecting items front a food menu as the patron selects the items in real-time on his/her portable patron unit **102**.

Location application **331** facilitates displaying real-time locations of a particular portable patron unit **102** to enable staff members to locate a particular patron when responding to a request or when delivering/serving an item.

Accordingly, application programs **130** (i.e., **224**, **326**, **327**, **329**, and **331**) execute on processor(s) **306** and can be stored as computer-executable instructions in memory of portable staff unit **302**. Although application programs **224**, **326**, **327**, **329**, and **331** are illustrated and described as single applications or module(s), each can be implemented as one or more combined component applications, and can be fully or partially received from other devices, such as one or more servers, (e.g., central unit **106**).

For purposes of illustration, programs and other executable program components such as the operating system are illustrated herein as discrete blocks, although it is recognized that such programs and components reside at various times in different storage components of portable staff unit **104**, or other components of patron service system **100**, and may be executed by one or more processors that are not necessarily part of portable stair unit **104** (such as one or more processor(s) of central unit **106**). Additionally, programs, such as application programs **224**, **226**, **227**, **229**, and module **231**, are fully customizable.

Other elements such as lights, LEDs, batteries, power supplies, charging connections, microphones, vibrating devices, antennae and so forth are also not shown in either FIG. **2** or **3**, but may be a part of the exemplary portable staff unit **104**.

Exemplary Central Unit

FIG. **4** illustrates an example of a central unit **106** within which application programs **130** and other functionalities described herein can be either fully or partially implemented. Central unit **106** can be implemented with numerous other general purpose or special purpose computing systems and/or configurations that may be suitable for use including, but are not limited to, personal computers, server computers, multiprocessor systems, microprocessor-based systems, network PCs, minicomputers, mainframe computers, distributed computing environments that include any of the above systems or devices, and the like.

Application programs **130** may be described in the general context of computer-executable instructions, such as program modules, being executed by a computer. Generally, program modules include routines, programs, objects, components, data structures, etc. that perform particular tasks or implement particular abstract data types. Application programs **130** may also be practiced in distributed computing environments where tasks are performed by remote processing devices (e.g, portable patron units **102** and portable staff units **104**) that are linked through a communications network or other network(s), such as network **110**. In a distributed computing environment, program modules may be

located in both local and remote computer storage media including memory storage devices.

The components of central unit **106** can include, but are not limited to, one or more processors (or processing units) **404** and memory **406**. Although not shown, a system bus typically connects the various components within central unit **106**.

Memory **406** represents a variety of computer readable media. Such media can be any available media that is accessible by central unit **106** (or processors **404**) and includes both volatile and non-volatile media, removable and non-removable media. For instance, memory **406**, may include computer readable media in the form of volatile, memory, such as RAM and/or non-volatile memory, such as ROM.

Memory **406** can also include other removable/non-removable, volatile/non-volatile computer storage media. Such examples include a hard disk drive (not shown) for reading from and writing to a non-removable, non-volatile magnetic media (not shown), a magnetic disk drive for reading from and writing to a removable, non-volatile magnetic disk (e.g., a "floppy disk"), or an optical disk drive for reading from and/or writing to a removable, non-volatile optical disk (not shown) such as a CD-ROM, DVD-ROM, or other optical media.

Memory **406** and its associated computer-readable media provide non-volatile storage of computer readable instructions, data structures, program modules, and other data for central unit **106**. Other types of computer readable media which can store data that is accessible by a central unit **106** can also be utilized to implement memory **406**, examples of such include flash memory cards, CD-ROM, digital versatile disks (DVD) or other optical storage, random access memories (RAM), read only memories (ROM), electrically erasable programmable read-only memory (EEPROM), and the like.

Any number of program modules can be stored in memory **406**, including by way of example, an operating system **426**, one or more application programs **130**, other program modules **430**, and program data **432**. Each of such operating system **426**, one or more application programs **130**, other program modules **430**, and program data **432** (or some combination thereof) may include an embodiment of application programs **130**. Memory **406** may also include one or more databases **112** containing data and information enabling functionality associated with application programs **130**. In one implementation, operating system **426** includes the Windows® XP operating system from Microsoft® Corporation. Other operating systems may be resident in memory **406** such as UNIX and/or Linux.

A user can enter commands and information into central unit **106** via input devices such as a keyboard **434** and a pointing device **436** (e.g., a "mouse"). Other input devices **438** (not shown specifically) may include a microphone, joystick, game pad, satellite dish, serial port, scanner, and/or the like. These and other input devices are connected to processor **404** via interface and bus structures, such as a parallel port, game port, or a universal serial bus (USB). Staff members of a resort can enter programmable information into central unit **106** such as when updating and configuring menus, managing food and beverage menus, listing daily specials, defining serving zones of staff members, managing staff member assignments and deployment of portable staff units among staff members of resort **101**, and other information to be displayed on either portable patron units **102** or port able staff units **104**.

A monitor **442** or other type of display device can also be connected to the central unit **106** via an interface, such as a video adapter **444**. In addition to the monitor **442**, other output peripheral devices can include components such as speakers (not shown) and a printer **446** which can be connected to central unit **106** via input/output interfaces (not shown).

Central unit **106** can operate in a networked environment, or point-to-point environment, using logical connections to one or more remote computers, such as portable patron units **102**, portable staff units **104**, fulfillment center computers **108**, network **110**, hubs **111**, and so forth. A network interface or adapter **454** may provide access to network **110**. such as when network **110** is implemented as a LAN (local area network) **440** or WAN (wide area network).

In a networked environment, such as that illustrated in FIG. **4**, program modules and program applications **130** depicted relative to central unit **106**, or portions thereof, may be stored in a remote memory storage device. By way of example, application programs **130** may reside on a memory device in portable patron unit **102**, portable staff unit **104**, etc. For purposes of illustration, application programs and other executable program components, such as the operating system, are illustrated herein as discrete blocks, although it is recognized that such programs and components reside at various times in different storage components remote or locate, and are executed by processor(s) of central unit **106** or remote devices.

As mentioned above, memory **406** includes application programs **130** as well one or more databases **112**. Application programs **130** that are utilized by both portable patron units **102** and portable staff units **104** (such as application programs **224**, **226**, **227**, **229**, **326**, **327**, **329**, and **331**) are generally managed and controlled by central unit **106**. Database **112** generally includes data and information necessary to support application programs **130**. For example, advertisement application **229** facilitates displaying promotional messages and/or advertisements on display device **114**. Central unit **106** supplies the promotional messages and/or advertisements (the content) to portable patron units **102** in conjunction with advertisement application **229**.

Accordingly, central unit **106** acts as a server to client devices such portable patron units **102** and portable staff units **104**. In a server role, central unit **106** supplies content to portable patron units **102** and portable staff units **104**. The content is stored in memory **406** in the form of data that may be maintained in one or more databases **112**. In one implementation database **112** is maintained by a Microsoft's SQL server 2000, although other database management systems may be used, such as IBM's DB2 database software, or off-the-shelf database management systems from other companies such as Sybase, Informix, and so forth.

Memory **406** includes several application programs **130** particularly suited for central unit **106**, and is used to potentially service other application programs or for providing management capability for central unit **106**. For example memory **406** includes: a routing application **480**, database application **482**, a location application **484**, a staff-input application **486**, and POS interface **488**.

Routing application **480** generally facilities receiving orders and/or requests from portable patron units **102** and routing them to a fulfillment center computer **108** responsible for handling the order and/or request.

Database application **482** generally facilitates storing and maintaining data in one or more databases **112**. For instance, database application **482** may maintain menu items including descriptions of the items, prices, photos, etc. in

database(s) **112**. Database application **482** may also maintain a history of transaction data, patron preferences, etc. which can all be used for patron profile maintenance. Database application **482** may also maintain data associated with staff performance, such as the number of orders completed, time used to fulfill orders, etc. Typically, information maintained in one or more databases **112** may be accessed by various other program applications **130** when requested.

Location application **484** facilitates locating portable patron devices **102** based on signals emitted by its control unit **201**. Location application **484** may use 802.11 location finding technology to determine locations of portable patron devices **102** and relay their positions to portable staff units **104**. In one implementation, location application **484** uses positioning technology developed by Ekahau, Inc. of Helsinki, Finland, such as Ekahau Positioning Engine™ (EPE), which is a Java-based positioning program that provides location coordinates of portable devices such as portable patron units **102** and portable staff units **104**. Utilizing EPE's engine would enable central unit **106** to determine the location of portable patron unit **102** accurate to within three and half feet of the unit's actual location both indoors and outdoors. Accordingly, once a portable patron unit **102** is logged onto the system **100** and emits a wireless signal to hubs **111**, central unit **106** would then be able to track the location of the portable patron unit **102** in real-time. This information can then be relayed to one or more portable staff units **104**, which display the patron unit's location on a map associated with any area or zone being served by the portable staff units **104**. Alternatively, global positioning technology could also be used to track the location of portable patron units **102**.

Staff-input application **486** enables staff members of resort **101** to enter information into central unit **106**, such as daily specials, updates to menus, price changes, messages to staff members or patrons, security information, and so forth that is then stored in memory **406** (such as database **112**) and may be utilized by applications **130**.

POS interface application **488** facilitates integrating POS and hotel management systems with central unit **106**. For instance, in one implementation POS interface application **468** includes Application Programming Interfaces (APIs) that may serve as an interface layer between POS interface application **488** and other POS and hotel management systems. Alternatively, direct interfaces may be used in the event API technology is not available with POS and hotel management systems.

Thus, application programs **130** (i.e., **224**, **226**, **227**, **229**, **326**, **327**, **329**, **331**, **480**, **482**, **484**, **486**, **488**) may execute on processor(s) **404** and can be stored as computer-executable instructions in memory **406** accessible by central unit **106**. Although application programs **130** are illustrated and described as single applications or module(s), each can be implemented as one or more combined component applications, and can be fully or partially received from other devices.

For purposes of illustration, programs and other executable program components such as the operating system are illustrated herein as discrete blocks, although it is recognized that such programs and components reside at various times in different storage components of central unit **106**, or other components of patron service system **100**, and may be executed by one or more processors that are not necessarily part of central unit **106**.

It should be noted that central unit **106** may include other capabilities such as the ability to serve games, serve music, and/or videos to portable patron units **102**. Central unit **106** may also act as an IP router switch enabling VoIP or Voice Over WiFi-capability between portable patron units **102** and other devices connected to network **110**.

Exemplary System Operation

FIG. **5** illustrates an exemplary display screen **500** rendered on a display device **114** (FIG. **1**) of portable patron unit **102** In particular, display screen **500** provides a user selectable menu, which enables the patron to browse information, request services, and/or order items as well as other functionalities. Display screen **500** forms part of a user interactive interface and includes a main menu **501** having selectable icons, such as a resort services icon **502**, a resort activity icon **504**, and a food/beverage menu **506**. Selecting resort services icon **502** activates a mode of operation for portable patron unit **102** associated with order/service application **226** (FIG. **2**), such as receiving information about the hotel, requesting non-food services, etc.

Selecting resort activities icon **504** activates a mode of operation also associated with order/service application **226** (FIG. **2**) such as displaying information associated with scheduling activities, which may include reserving a tennis court, reserving a tee time, requesting a boat, browsing and selecting tours, scheduling a massage, etc.

Selecting food/beverage icon **506** activates a mode of operation also associated with order/service application **226** (FIG. **2**) such as viewing a food or beverage menu, browsing nutritional information, ordering food or beverages, and so forth. As represented in FIG. **5**, a patron has selected food/beverage icon **506**. Accordingly, the next user interface to be displayed by control unit **201** (FIG. **2**) will pertain to viewing food/beverage menus and/or ordering items associated with such menus.

Portable patron unit **102** may include a button **508**, an icon (not shown) on display screen **500**, or other related selection means such as a switch, key, etc., that provides a means for a patron to prompt portable patron unit **102** to wirelessly page a staff member for immediate service. For example, pressing button **508** causes portable patron unit to select a paging mode associated with order/service application **226** (FIG. **2**).

Although only these three icons and button **508** are shown in FIG. **5**, any combination of differing types of additional information can be included in display screen **500** to further enable a patron to interact with portable patron unit. For instance, display screen **500** may include additional icons associated with purchasing other products, viewing other information such as messages or browsing the Internet, conducting VOIP conversations, and so forth. Other selectable elements could be used, instead of, or in conjunction with icons such as a keypad/keyboard (not shown), a pointing device (not shown), and/or a mouse (not shown), etc. Additionally, one or more of the icons on display screen **500** may appear on other display screens/pages presented on display device **114**. Accordingly, some or all of the icons may be displayed in different formats, in different screens, in different order, with different verbiage, etc.

FIG. **6** illustrates an exemplary display screen **600** presented to patrons on display device **114** after selecting food/beverage icon **506** shown in FIG. **5** or maybe also after selecting a beverage menu icon (not shown). In particular, display screen **600** provides a user selectable menu, which enables the patron to browse information regarding and/or order items associated with ordering beverages. Control unit **201** facilitates display of display screen **600**.

Display screen **600** includes an exemplary beverage menu **602** for ordering blended drinks that may be selected after selecting a mixed drink icon or button (not shown). Bever-

age menu **602** may be one of several menus that a patron can access after selecting food/beverage icon **506** and several intermediate food or beverage menus may be selected by a patron before arriving at beverage menu **602**. Beverage menu **602** includes particular beverage icons **604**, prices associated with the a particular beverage, and a selectable control **606** within screen **600** to generate different beverage selection screens, such as by manipulating arrows in a selectable control **606** or by other screen selection/manipulation means such as tabs, buttons, etc. Additionally, the beverage choices may be depicted in several display windows.

Also depicted in display screen **600** is an advertisement **608**. Advertisements are generally generated by a mode of operation associated with advertisement application **229**. The advertisement generation correlates (i.e. is appurtenant) to the item viewed or ordered by the patron, which in this example relates to buying three frozen margaritas for the price of two. The advertisement could also correlate to a service requested. Another advertisement **610** may be displayed in conjunction with advertisement **608** (although it may be displayed separately). In this example, advertisement **610** is a promotion message detailing a happy hour special. Although not shown in this example, the advertisement could also be displayed on display screen **600** or other screens to cross-sell and/or up sell recommendations based on an item ordered and/or service requested by a patron. For instance, a cross-sell recommendation may include providing an alternative or competing brand of margarita mix or an alternative type of alcohol. An up sell recommendation may include offering a more expensive, promotional, or better quality alcohol as an alternative to what the patron may have selected.

Order another round icon **612** allows a patron to automatically order another round of drinks or other items previously ordered by selecting icon **612**. Selecting icon **613** may display items that the patron previously ordered during the day, making it easy to view previous order and order one or more items based on the logged history.

Although not shown, display screen **600** may also include selection items enabling a patron to customize orders, select condiments, select preparation methods, select side dishes, etc. For instance, display screen **600** may display a flavor associated with a drink, the option to order the drink with or without salt, the option to order the drink with or without ice, and so forth. Each of the options presented typically relate to the item selected by the patron and can be tailored by a resort through the use of patron service system **100**.

It is noted that display screen **600** is only one example of screens that may be used in association with ordering items or requesting services. Additionally, one or more of the icons present on display screen **600** may appear on other display screens presented on display device **114**. Accordingly, some or all of the icons may be displayed in different formats, in different screens, in different order, with different verbiage, etc. It is also appreciated that one or more portions of screen **600** are customizable and may not be presented in certain implementations.

FIG. **7** illustrates an exemplary display screen **700** presented to patrons after selecting food/beverage items for order. In particular, display screen **700** provides a user selectable menu, which enables the patron to preview, correct or change selected items before actual submission of the order. Control unit **201** facilitates display of display screen **700**.

Display screen **700** may includes confirmation information **702**. For instance, once the item or service is chosen and a patron indicates completion of the selection by touching confirmation icon **704**, the patron may be prompted to enter security, identification or other information before the order/request is processed such as via information block **706**. This is to ensure that the patron is authenticated before the order/request is accepted. In one implementation, the information is entered into information block **706** by interacting with a touch-screen. Alternatively, in other implementations this information may be entered via a keypad (not shown), or by other means such as by biometrics.

The patron may preview an order before submitting it as via a preview area **712**. To confirm the information displayed in preview area **712**, the patron would select a "submit now" type of button or use some other tool or any other selection means. To cancel the order/request, the patron would select a cancel icon **708** or any other selection means. To correct or change information, the patron would select a correction icon **710** or any other selection means.

Display area **714** may indicate real-time information relating to a pending order. For example, display area **714** may indicate that an order is currently pending in the kitchen and thus is not available for delivery by a waiter yet. Using display area **714**, a patron may be kept abreast of the status of his order in real-time

A preference icon **716** may also be presented to a patron enabling a patron to input or view preference information associated with the patron including: special needs/requests of the patron; dietary restrictions; medical needs; and/or information associated with the patron from prior visits to resort **101**.

FIG. **7** is only an example screen. Some or all of the icons may be displayed in different formats, in different screens, in different order, with different verbiage, etc. Portions of display screen **700** are optional and may not be presented in certain implementations.

FIG. **8** illustrates an exemplary display screen **800** rendered on a display device **116** (FIG. **1**) of portable staff unit **104**. Display screen **800** is used by staff members to view notifications **808** and other information associated with servicing patrons. For instance, in one implementation, display screen **800** includes selectable icons **802** (e.g., **810**, **812**, **814**, **816**, **818**, **820**, **822**, **824**, **826**, **828**, and **830**), some of which display dynamic information. Dynamic information that a staff member may view on display screen **800** may include a quantity of patrons currently logged onto the system, the quantity of orders pending, the quantity of patrons located in certain areas of the resort, a quantity of patrons having requested their bills, a quantity of patrons currently preparing orders, and the quantity of patrons browsing on their portable patron units, etc. Control unit **301** facilitates display of display screen **800**.

Display screen **800** may include an icon listing the name of a staff member **804** recognized by patron service system **100** as using this particular portable patron unit **104**. Display screen **800** may also include a date and time bar or icon **806**.

Display screen **800** may include a service request icon **810** indicating the quantity of patrons with a pending service request. The service request may involve a page from a patron for immediate service, or some other type of service offered by resort **101** to patrons. To ascertain details about one or more requests, the staff member would select icon **810** (i.e., touch icon **810**), which would prompt a window or new display screen to appear on display device **116** that would describe specific details of the request.

Display screen **800** may include a bill request icon **812** indicating the quantity of patrons with a pending bill request. If the bill request was pending, the staff member would

select icon **812**, which would prompt a window or new display screen to appear on display device **116** that may describe which patrons are requesting their bill, further details about bills, patron identification, itemized information, payment methods, etc.

Display screen **800** may include a delivery notification icon **814** indicating how many orders are ready for delivery in fulfillment centers **109** If an order was ready for delivery, the staff member could select icon **814**, which would prompt a window or new display screen to appear on display device **116** that would describe which orders were ready for delivery, and details of the orders, such as the fulfillment center **109** location of the prepared orders, the identification of the patron waiting to receive the order.

Display screen **800** may also include an ordered notification icon **816** indicating how many non-service orders are pending. To ascertain details about the order, the staff member may select icon **816**, which would prompt a window or new display screen to appear on display device **116** that would describe specific details about the pending order.

Display screen **800** may include a real-time ordering notification icon **818** indicating how many patrons are currently ordering items. If a patron were in the process of making an order, the staff member could select icon **818** which would prompt a window or new display screen to appear on display device **116** enabling the staff member to view actions performed by the patron as they are performed by the patron in real-time when making an order.

Display screen **800** may include a browsing notification icon **820** indicating how many patrons are currently browsing information on their portable patron units **102**. To view what a certain patron is browsing, the staff member may select icon **820**, which may prompt a window or new display screen to appear on display device **116** that would show or list details about the patron's activities in real-time.

Display screen **800** may include a pool-online icon **822** indicating how many patrons are logged onto patron service system **100** and are located at the pool. In the exemplary illustration, 14 patrons are actively on-line. To ascertain details about the patrons on-line, such as their names, exact locations, and so forth, the staff member may select icon **822** (i.e., touch icon **822**), which would prompt a window or new display screen to appear on display device **116** describing details about the patrons using portable patron units located around the resort's pool.

Display screen **800** may include a beach-online icon **824** indicating how many patrons are logged onto patron service system **100** and are located at the beach. In the exemplary illustration, six patrons are actively on-line. To ascertain details about the patrons on-line, such as their names, locations, and so forth, the staff member may select icon **824**, which would prompt a window or new display screen to appear on display device **116** describing details about the patrons using portable patron units located on the beach.

Display screen **800** may include a menu icon **826**, which when selected may prompt a window or new display screens enabling staff-members to view food and beverage menus. Accordingly, a portable staff unit **104** can perform ordering functions like a portable patron unit **102**, such as placing an order, which allows staff members to instantly transmit an order taken verbally such as where a patron prefers not to enter the order directly on their portable patron unit **102**. Menu icon **826** may also enable a staff member to "take over" an order from portable patron unit **102**, edit and transmit the order, such as where the patron is having difficulty with the system.

Display screen **800** may include a patron icon **828**, which when selected would prompt a window or new display screens enabling staff-members to view information about particular patrons.

Display screen **800** may include a staff/messages icon **830** that may flash or light-up indicating that the staff member has received a message or been paged. To ascertain details about the message, the staff member may select icon **830**, which would prompt a window or new display screen to appear on display device **116** that describes details about the message. When a message is received, portable staff unit **104** may also vibrate or ring to alert the staff member of the message.

FIG. **8** is only an example screen. Some or all of the icons may be displayed in different formats, in different screens, in different order, with different verbiage, etc. Portions of display screen **800** are optional and may not be presented in certain implementations.

FIG. **9** illustrates an exemplary display screen **900** providing details about an order to a staff member. Display screen **900** is typically prompted after a staff member selects ordered icon **816**. Display screen **900** may include information identifying the patron (**902**), such as the patron's name, room number, and seat-number (such as at a pool or in a restaurant or any other location information). Additional information may be provided, including a patron's preferences, history, special requests, medical requests, etc. Display screen **900** may also specify items ordered **904** such as a type of liquor, brand of water, etc. Control unit **301** (FIG. **3**) facilitates display of display screen **900**.

A staff member may quickly locate the patron by selecting locate patron icon **906**, which may prompt a map associated with resort **101** and the location of the portable patron unit **102** used by the patron.

Once an order is delivered to a patron, a staff member may press order delivered icon **908**, which prompts portable patron unit **104** to send a message to central unit **106** closing out the open order. A staff member may also return to the main menu by selecting icon **910**.

It should be appreciated that FIG. **9** is only an example screen. Some or all of the icons may be displayed in different formats, in different screens, in different order, with different verbiage, etc. Portions of display screen **900** are optional and may not be presented in certain implementations.

FIG. **10** illustrates an exemplary display screen **1000** on portable staff unit **104** for displaying locations of portable patron devices. In this example, display screen **1000** is typically prompted after a staff member selects locate patron icon **906** (FIG. **9**). Display screen **1000** may include a map **1002** associated with resort **101** and the location of the portable patron units **1002** indicated by dark blocks **1004**, although other shapes, descriptions, etc., may be used to indicate locations of a patron, such as text, circles, blimps, and various other indicia. Non-shaded blocks, such as block **1006**, indicate empty positions not occupied by portable patron unit **102**, although any other item may be used to identify an empty position. Block **1008** includes an identifier, such as an X, which indicates a precise location of a particular portable patron unit **102** that has requested a service and/or an order that is to be delivered. Other identifiers may be used to indicate the relative location of a portable patron unit **102**, or lack thereof, such as a bulls-eye, an arrow, a flashing block, and various other indicia. Pinpointing the location of a patron enables efficient and effective service of mobile patrons while in any areas of a resort. The relative location of the portable patron unit **102** can be dynamically displayed in real-time as the patron

moves from one area of resort **101** to another area of resort **101**, such as from the beach to the pool **1010**.

FIG. **10** is only an example screen. Some or all of the icons may be displayed in different formats, in different screens, in different order, and with different verbiage, etc. Portions of display screen **1000** are options and may not be presented in certain implementations. Control unit **301** facilitates display of display screen **1000**.

Methods for Patron Service System

Methods for patron service system **100** may be described in the general context of computer-executable instructions. Generally, computer-executable instructions include routines, programs, objects, components, data structures, etc. and the like that perform particular functions or implement particular abstract data types. The described methods may also be practiced in distributed computing environments where functions are performed by remote processing devices that are linked through a communications network. In a distributed computing environment, computer-executable instructions may be located in both local and remote computer storage media, including memory storage devices.

FIG. **11** is a flow diagram that illustrates an exemplary method **1100** of operation associated with portable patron unit **102**. The order in which the method is described is not intended to be construed as a limitation, and any number of the described method blocks can be combined in any order to implement the method. Each of the operations and blocks may be optional and do not necessarily have to be implemented. Furthermore, the method can be implemented in any suitable hardware, software, firmware, or combination thereof. Exemplary method **1100** includes blocks **1102** through **1128**.

In block **1102**, portable patron units are provided to patrons at a resort, stadium/arena, or other establishments. For example, in a resort environment, a portable patron unit **102** maybe provided to a patron at check-in, at various areas of the resort, such as arrival at a beach or pool area. The portable patron units may be fastened and locked to a chair, lounge, table, etc. Alternatively. patrons may carry the portable patron units.

In block **1104**, the portable patron unit is powered-on and connects wirelessly to a wireless network. For example, portable patron unit **102** connects to network **110** and is recognized by central unit **106**. A staff member of resort **101** may enter a patron's room number using display device **114**, verify the patron's name as displayed on display device **114** as retrieved from database **112** or another memory device such as a resort's Property Management System interface (not shown). At this point, the patron may choose a pin security code and verify the pin code for security purposes.

In block **1106**, the portable patron unit transmits signals wirelessly that enable one or more other devices to determine the location of the portable patron unit. For example, central unit **106** may receive coordinate information from network **110** based on calculations made from a signal received from the portable patron unit **102** with respect to and through one or more hubs **111**. This coordinate information may be translated by the central unit **106**, mapped to locations associated with resort **101**, and sent to other devices (such as portable staff units **104**) for display to enable staff members to locate the portable patron unit.

In block **1108**, information (also referred to as content) is displayed on portable patron unit **102**. The information may include a user interface, display screens including menus, main menus, food and beverage menus, sub-menus associated with the main menus or food and beverage menus, such as specific drinks, appetizers, sandwiches, etc. The menus may offer the patron the ability to select a quantity of items desired, prices, selection of condiments, selection of side dishes, preparation methods, and so forth. A server side device, such as central unit **106**, typically supplies the information (i.e., content) to portable patron unit **104**.

In block **1110**, a patron may order items and/or request services via a portable patron unit **102** and transmit the order/request wirelessly to the network or directly to other devices via a point-to-point wireless connection. For example, a patron may order items and/or request services via a user interface on display device **114** of portable patron unit **102** and transmit the order/request wirelessly to network **1110**. When the patron is satisfied with an order and/or request, the patron may press an icon or button, or other related mechanism, to transmit the order/request.

In block **1112**, if the patron has placed previous orders, the patron can access information about the previous order and can re-order any or all of the items. For example, a patron may select previously ordered icon **612** (FIG. **6**) to automatically order another round of drinks.

In block **1114**, the patron may view preferences, special needs, or special requests displayed on the portable patron device. For example, portable patron unit **102** may display preference information, special needs/requests, and information from prior visits. Additionally, the patron **102** may enter preference information, special needs/requests and information into the portable patron unit **102** for future reference by central unit **106** or other devices associated with resort **101**.

In block **1116**, prior to submitting or accepting an order the portable patron unit may request that the patron enter security information such as a PIN code previously selected and entered in to the system by the patron. This information is then verified and authenticated. Alternatively, other authentication measures could be performed.

In block **1118**, advertisements or promotional messages are displayed. The advertisements or promotional messages may be generated in response to items or services requested by the patron. For example, recommendations, promotions, and featured items can be displayed based on items selected by the patron. The advertisements or promotional messages may include displaying cross-sell and/or up-sell recommendations based on the items ordered and/or services requested by the patrons. The advertisements may not be related to any response or action performed by a patron.

In block **1120**, real-time status information about a pending order may be displayed. For example, a display area **714** (FIG. **7**) may be generated on portable patron unit **102** providing real-time information relating to a pending order or request for service.

In block **1122**, paging a staff member or requesting immediate assistance is enabled. For example, a patron may select a "call service" type button, icon, or related mechanism, which prompts portable patron unit **102** to page a staff member for immediate assistance.

In block **1124**, bill requests are enabled. For example a patron may select a button, icon, or related mechanism, which prompts portable patron unit **102** to transmit a wireless signal requesting delivery of a bill. Alternatively, the patron may receive a virtual bill (i.e., electronic bill) on the display device **114** and approve payment of the bill without the assistance of a staff member.

In block **1126**, interactive games may be offered to patrons. For example, interactive games may be selected and played on the portable patron units **102**, including games

that utilize the Internet. Additionally, telephony access may be provided to patrons, such VoIP or voice over WIFI capability.

In block **1128**, movies, music and static photos may be offered and generated for the patron via portable patron unit **102**. For example, portable patron units **102** are capable of displaying movies, playing music, displaying photos, etc.

It is noted that the patron can press a touch-screen button to end a session and logoff network **110**, or the portable patron unit may automatically power down and logoff the patron after period of time.

It is also noted that program applications **130** such as off-the-shelf application(s) **224** (FIG. **2**), order/service application **226** (FIG. **2**), patron application **227** (FIG. **2**), advertisement application **229** (FIG. **2**) as well as location module **231** executing on processor(s) **206** (FIG. **2**) and **408** (FIG. **4**) and stored in memory **216** (FIG. **2**) and **406** (FIG. **4**) memory, may be implemented to perform one or more portions associated with method **1100**.

Accordingly, program applications **130** generate menus, user interfaces, guides, screens, etc. for display which enable a patron to navigate and perform activities, order items, request services, browse information (locally or remotely via the Internet), view movies, play and view interactive game selections, view and play music selections, conduct voice conversations, etc. Application programs **130** also enable a patron's transactions to be processed.

FIG. **12** is a flow diagram that illustrates an exemplary method **1200** of operation associated with portable staff unit **104**. The order in which the method is described is not intended to be construed as a limitation, and any number of the described method blocks can be combined in any order to implement the method. Some of the operations and blocks may be optional and do not necessarily have to be implemented. Furthermore, the method can be implemented in any suitable hardware, software, firmware, or combination thereof. Exemplary method **1200** includes blocks **1202** through **1226**.

In block **1202**, portable staff units are provided to staff members at a resort, stadium/arena, or other establishments. For example, in a resort environment, a portable staff unit **104** maybe provided to a waiter for use in a pool area, to another waiter servicing the beach, and so forth. Staff members may carry the portable staff units **104**.

In block **1204**, the portable staff unit is powered-on and connects to a wireless network. For example, portable staff unit **104** connects to network **110** and is recognized by central unit **106**. At this point, the portable staff unit may be logged onto network **110**. Security authentication procedures may be performed when logging portable staff units **104** onto network **110**.

In block **1206**, details about an order or request are displayed. For example, details of items associated with an order are displayed on display device **116** of portable staff unit **104**.

In block **1208**, notifications indicating when an order or service request is ready for pickup from a fulfillment center **109** and delivery to a patron are received and displayed. For example, portable staff unit **104** receives notifications wirelessly that a patron's order (or potentially a service request) is ready for delivery and delivery to a patron. The notifications may be sent directly from fulfillment center computers **108** or via central unit **106**. Once an order is delivered, the order may be closed by touching a button or other means of selection on portable staff unit **104** to indicate that the order has been delivered.

In block **1210**, details about a patron may be rendered and displayed. For example, portable staff unit **104** may display details about a patron including the patron's room number, preference information, special needs/requests, information associated with prior visits, notes made by other staff members about the patron, and so forth.

In block **1212**, the number of patrons using their portable patron units **102** are displayed. For example, portable staff unit **104** displays patrons logged onto network **110** and possibly their relative zone locations, such as the pool or beach. Portable staff unit **104** may limit the display to the quantity of patrons logged into the network in a particular zone of responsibility for a staff member.

In block **1214**, the actual location of a portable patron unit **102** may be determined and displayed on portable staff units **104** (or other devices) to enable staff members to quickly and efficiently deliver items ordered or services requested directly to a patron.

In block **1216**, the quantity of outstanding orders pending that have not been delivered and closed-out may be displayed on a portable staff unit **104**.

In block **1218**, messages generated by the resort or staff members of the resort, patrons and potentially other entities, may be transmitted and displayed on portable staff units **104**.

In block **1220**, portable staff units **104** may receive a notification of a page from a portable patron unit **102** that a patron is requesting immediate service, e.g., the patron has selected a call service button or any other type of paging mechanism on their portable patron unit **102**.

In block **1222**, portable staff units **104** may receive and display menus (such as food and beverage menus) such as to enable staff members to view the menus, answer questions about the menu items, and/or take an order at the request of patron, etc.

In block **1224**, portable staff units **104**, receives and displays a notification/page that a patron has requested their bill.

In block **1226**, the real-time activity of a patron performed on a portable patron device **102** is displayed on portable staff unit **104**.

It is noted that program applications **130** such as off-the-shelf application(s) **224**, order/service application **326**, patron information application **327**, real-time activity application **329**, and location application **331** executing on processor(s) **306** (FIG. **2**) and **408** (FIG. **4**) and stored in memory **216** (FIG. **3**) and **406** (FIG. **4**) are implemented to perform one or more portions of the functionality associated with method **1200**. Accordingly, program applications **130** generate menus, user interfaces, guides, screens, and so forth for display which enable a staff member to service patrons, such as receiving orders, viewing order details, receiving the location of portable staff units, receive service requests, browse information, and so forth.

FIG. **13** is a flow diagram that illustrates an exemplary method **1300** of operation associated with central unit **106**. The order in which the method is described is not intended to be construed as a limitation, and any number of the described method blocks can be combined in any order to implement the method. Each of the operations and blocks may be optional and do not necessarily have to be implemented. Furthermore, the method can be implemented in any suitable hardware, software, firmware, or combination thereof. Exemplary method **1300** includes blocks **1302** through **1316**.

In block **1302**, central unit **106** communicates with portable patron units **102** and portable staff units **104** as a server in a client/server relationship.

In block **1304**, central unit **106** distributes content to both the portable patron units **102** and portable staff units **104**. The content may include menus for order items, services offered by the resort, advertisements, a history of an item previously ordered by a particular patron, preference information, special needs/requests and preference information associated with a patron, status of an open or request, and so forth.

In block **1306**, central unit **106** receives transaction information from the portable patron units **102** and portable staff units **104**. The transaction information may include orders, requests for services, requests for a bill, etc.

In block **1308**, central unit **106** processes the transaction information by routing orders or requests to appropriate staff members or fulfillment centers to be carried out. Central unit **106** may also store the transaction information in databases **112** (FIG. **1**).

In block **1310**, central unit **106** interfaces with POS computers such as fulfillment center computers **108** and hotel management systems.

In block **1312**, central unit **106** determines the location of portable units such as portable patron units **102** and sends details of the location (such as on a map) to portable staff units for display.

In block **1314**, central unit **106** verifies portable patron units **102** and portable staff units **104** as authorized devices and authenticates their users based on security codes.

In block **1316**, central unit **106** maintains a databases **112** necessary for servicing content to other units, such as maintaining transaction information, maintain menu information, descriptions, photos, prices, status of items (such as "sold out"), and so forth. A database **112** may also contain information to enable resort management to monitor performance of staff (such as how many orders have been serviced and/or time used to deliver and/or fulfill orders), average sale prices, best selling items, beverage to food ratios, abandoned orders, page views, and so forth.

In block **1316**, central unit **106** serves as an interface to other devices such as a gateway to the Internet or as an interface to POS systems, etc.

It is noted that program applications **130** and data stored in memory **406** are implemented to perform one or more portions of the functionality associated with method **1300**.

Although some implementations of the various methods and arrangements of the present invention have been illustrated in the accompanying Drawings and described in the foregoing Detailed Description, it will be understood that the invention is not limited to the exemplary aspects disclosed, but is capable of numerous rearrangements, modifications and substitutions without departing from the spirit of the invention as set forth and defined by the following claims.

What is claimed is:

1. A system for locating electronic devices, the system comprising:

a plurality of mobile electronic devices, each of the plurality of mobile electronic devices comprising a wireless communications interface; and

a computing system comprising one or more processors and one or more data stores coupled to the one or more processors having instructions stored thereon which, when executed by the one or more processors, causes the one or more processors to perform operations comprising:

providing a venue-specific application to each of the plurality of mobile electronic devices;

receiving, from each of the plurality of mobile electronic devices, first location signals through the venue specific application of each respective mobile electronic device;

determining first locations of each of the plurality of mobile electronic devices based on the first location signals;

receiving second location signals from each of the mobile electronic devices;

determining updated locations of each of the mobile electronic devices based on the second location signals;

receiving, from a particular one of the mobile electronic devices, order information for a venue associated with the venue-specific application; and

in response to receiving the order information, sending, to a computing system associated with the venue, for display in a graphical user interface, data indicating the updated location of the particular one of the plurality of mobile electronic devices.

2. The system of claim **1**, wherein each of the mobile electronic devices comprise a vibrating device, and

wherein the operations of the computing system further comprise sending, to the particular one of the mobile electronic devices, a message to activate the vibrating device.

3. The system of claim **1**, wherein each of the mobile electronic devices comprise one or more light emitting diodes (LEDs), and

wherein the operations of the computing system further comprise sending, to the particular one of the mobile electronic devices, a message to activate at least one LED.

4. The system of claim **1**, wherein the operations of the computing system further comprise:

receiving data indicating a user input requesting a location of a particular one of the mobile electronic devices; and

in response, providing, for display in the graphical user interface, data indicating the updated location of the particular one of the mobile electronic devices.

5. The system of claim **1**, wherein the operations of the computing system further comprise:

mapping the first locations of the plurality of mobile electronic devices to a region that is associated with a venue; and

providing, for display in the graphical user interface, data indicating the first locations of the plurality of mobile electronic devices.

6. The system of claim **5**, wherein the operations of the computing system further comprise:

mapping the updated locations of the plurality of mobile electronic devices to the region that is associated with the venue; and

providing, for display in the graphical user interface, data indicating the updated locations of the plurality of mobile electronic devices.

7. The system of claim **1**, wherein the operations of the computing system further comprise:

mapping the first location of one of the plurality of mobile electronic devices to a first region that is associated with a venue; and

providing, for display in the graphical user interface, data indicating that the one of the plurality of mobile electronic devices is located in the first region.

8. The system of claim 1, wherein the operations of the computing system further comprise:

mapping the updated location of the one of the plurality of mobile electronic devices to a second region that is associated with a venue; and

providing, for display in the graphical user interface, data indicating that the one of the plurality of mobile electronic devices is located in the second region.

9. The system of claim 1, wherein one or more of the mobile electronic devices are portable patron units.

10. A system for locating electronic devices, the system comprising one or more processors and one or more data stores coupled to the one or more processors having instructions stored thereon which, when executed by the one or more processors, causes the one or more processors to perform operations comprising:

providing, over one or more wireless channels, a venue-specific application to each of a plurality of mobile electronic devices;

receiving, from each of the plurality of mobile electronic devices, first location information through the venue specific application of each respective mobile electronic device;

determining first locations of each of the plurality of mobile electronic devices based on the first location information;

receiving, over the one or more wireless channels, second location information from each of the mobile electronic devices;

determining updated locations of each of the mobile electronic devices based on the second location information;

receiving, from a particular one of the mobile electronic devices, order information for a venue associated with the venue-specific application; and

in response to receiving the order information, sending, to a computing system associated with the venue, for display in a graphical user interface, data indicating the updated location of the particular one of the plurality of mobile electronic devices.

11. The system of claim 10, wherein the operations further comprise:

receiving data indicating a user input requesting a location of a particular one of the mobile electronic devices; and

in response, providing, for display in the graphical user interface, data indicating the updated location of the particular one of the mobile electronic devices.

12. The system of claim 10, wherein the operations further comprise:

mapping the first locations of the plurality of mobile electronic devices to a region that is associated with a venue; and

providing, for display in the graphical user interface, data indicating the first locations of the plurality of mobile electronic devices.

13. The system of claim 12, wherein the operations further comprise:

mapping the updated locations of the plurality of mobile electronic devices to the region that is associated with the venue; and

providing, for display in the graphical user interface, data indicating the updated locations of the plurality of mobile electronic devices.

14. The system of claim 10, wherein the operations further comprise:

mapping the first location of one of the plurality of mobile electronic devices to a first region that is associated with a venue; and

providing, for display in the graphical user interface, data indicating that the one of the plurality of mobile electronic devices is located in the first region.

15. The system of claim 10, wherein the operations further comprise:

mapping the updated location of the one of the plurality of mobile electronic devices to a second region that is associated with a venue; and

providing, for display in the graphical user interface, data indicating that the one of the plurality of mobile electronic devices is located in the second region.

16. The system of claim 10, wherein the order information indicates a user selection of an order option from the venue-specific application.

17. The system of claim 10, wherein the operations further comprise sending, to the particular one of the mobile electronic devices, a message to activate a vibrating device on the particular one of the mobile electronic devices.

18. The system of claim 10, wherein the operations further comprise sending, to the particular one of the mobile electronic devices, a message to activate one or more light emitting diodes (LEDs) on the particular one of the mobile electronic devices.

19. The system of claim 10, wherein the operations further comprise:

communicating with the particular one of the plurality of mobile electronic devices to authenticate, based on a security protocol, a user of the venue-specific application on the particular one of the plurality of mobile electronic devices.

20. The system of claim 1, wherein the venue-specific application is associated with a plurality of venues.

21. The system of claim 1, wherein the venue is a retail location.

22. The system of claim 20, wherein the plurality of venues comprises a plurality of retail locations.

23. The system of claim 1, wherein the venue is a restaurant.

24. The system of claim 20, wherein the plurality of venues comprises a plurality of restaurants.

25. The system of claim 10, wherein the venue-specific application is associated with a plurality of venues.

26. The system of claim 10, wherein the venue is a retail location.

27. The system of claim 25, wherein the plurality of venues comprises a plurality of retail locations.

28. The system of claim 10, wherein the venue is a restaurant.

29. The system of claim 25, wherein the plurality of venues comprises a plurality of restaurants.

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